40 Roch Rd

POPULAR Computing WEEKLY

35p

12-18 April 1984 Vol 3 No 15

BRITAIN'S BEST-SELLING MICRO WEEKLY

STAR GAME
Pac Man on Commodore 64
See page 10

News Desk

Cut-price Dragons — end of line?

BRITISH Home Stores has caused Dragon some embarrassment by deciding to discontinue sales of the Dragon 32 micro

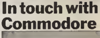
Remaining stocks of the computer have been sold off in some of the company's stores for as little as £87.50

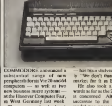
A spokeswoman for one BHS branch, confirming the substantial price drop, explained that the Dragon line was to be discontinued in favour of a machine from a rival manufacturer

The price change seems to have thrown both Dragon and other retailers into some confusion Boots, one of the larger Dragon stockists, denied that the company has any plans to lower its own £149 price A spokesman for Boots also reaffirmed its commitment both to the Dragon brand and to the 32K model

Following enquiries by GEC, British Home Stores claimed that the price drop was only in force for a few days to clear small remaining stocks

In touch with Commodore





COMMODORE announced a substantial range of new peripherals for its Vic 20 and 64 computers — as well as two new business micro systems — at the Hanover Computer Fair, in West Germany last week

The company also displayed its new 116 and 264 machines although their future now looks uncertain

Commodore UK's marketing manager John Baxter has announced that the 116 — a 16K micro with 'toy keyboard — has been shelved indefinitely "We don't think there is a market for it in Europe "

He also took a step backwards as far as the 264 machine is concerned Although this successor to the existing 64 model was originally planned for launch in June, he now says "We have not decided on a date for its introduction "

Among the new peripherals for the 64 shown in Hanover are a touch screen, the much-

continued on page 5

This Week

ULTIMATE

THE NOT·SO·SOFTWARE





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How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long. The articles, and any accompanying programs should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Editorial

Dungeons and Dragons, a mainstay of role-playing gamers for more than 10 years, is under attack.

A number of clergy in the UK, worried at the possible effects of the game on young children, have written to schools and parents, suggesting they ban *Dungeons and Dragons*.

It is easy to be cynical and accuse the clergy of being killjoys, who just want to prevent children from having fun. However, the church is obviously sincere in its belief that *Dungeons and Dragons* can be harmful. Nevertheless, the church is wrong.

To the best of my knowledge, there is not one case where a child has been disturbed through playing the game.

Dungeons and Dragons is essentially a game of the imagination. It allows people to explore worlds which range from the Tolkienesque to the far-flung future. The main difference between D&D and more conventional games is that there is no physical board. The action takes place in people's minds.

However, for all its complexity, *D&D* is still just a game. Its participants have no more interest in engaging in the occult than *Risk* and *Diplomacy* players have in taking part in a war.

It makes as much sense to ban *D&D*, because it contains references to demons, as to ban C S Lewis's *Screwtape Letters*, where the principal characters are demons.

Next Thursday

Tank Battle for the Spectrum, by Julian Chaudhury, is next week's Star Game

NEWS FLASH

TITANIC

15th April 1912

TITANIC SINKS. (THE "UNSINKABLE" STRIKES ICEBERG)

Our American correspondent via wireless telegraphy reports Late last night the S S TITANIC, pride of White Star line, was in collision with an iceberg approximately 300 miles off the coast of Newfoundland, it is feared that many lives have been lost Further reports to follow



22nd March 1984

N.A.S.A. SOURCES REVEAL POSSIBLE LOCATION OF "TITANIC"

At a Press Conference today a N A S A spokesman confirmed that recent photographs taken by their Intal-Sat G Marine Resources Satellite show a number of large sub-marine objects, one of which is thought to be the wreck of the TITANIC which sank 72 years ago next month.

NEWS FLASH

TITANIC

29th March 1984

GOLD FEVER — THE RACE IS ON

Following the disclosure last week that N.A S A. photographs could pinpoint the location of the "Titanic" – the Gold Rush is now on

Many groups are seeking sponsorship to recover the considerable quantity of gold which sank with the "Titanic".

Now is your chance to go for the Gold

The adventure begins.

TITANIC

The Adventure Begins...

With Currah Micro Speech

FREE on Side 2
a mini-epic in high energy rock
TITANIC (The music)

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Commodore

◄ continued from page 1

rumoured mouse cursor control device called The Cat, and a light pen

Four new printers for the Vic 20, Commodore 64 and 264 were announced — a low-cost dot-matrix, a high-speed dot-matrix, a colour dot-matrix and a low-cost daisy-wheel.

All of these products are expected to become available in the second half of this year.

The first of the new business systems is a 16-bit Z8000-based machine with 256K Ram, 80-column graphics and built-in dual floppy disc drives. The machine runs the Unix operating system.

The second is the previously announced tie-up to market the Hyperion IBM-compatible 8088-based computer under the Commodore brand name. The machine, with 256K Ram is expected to under-cut the IBM PC in price and sell for around £1,500.

No indication of availability was given for either of the business machines.

Robot association gets under way

THIRTY delegates from seven different countries assembled in Paris last month to establish the International Personal Robotics Association.

They included Nolan Bushnell, founder of Atari, and Skip Stevely, president of Androbot. Britain was well-represented with six delegates.

The organisation has deliberately been set up while the industry is still in its infancy. "The delegates are concerned that the robotics industry should achieve a certain amount of standardisation, both in the sense of establishing a commercial standard in robot manufacture and also in the realm of safety," explained an IPRA spokesman.

"As robots are machines inter-acting with people, the safety aspect is obviously important.

"Secondly, it wants to promote the idea of robots as something 'real', rather than a sci-fi gimmick."

The driving force behind the Association is Sidney Nata, head of the French company NATA Industries, who are concerned with both domestic and industrial robotics.

It is hoped that IPRA will be a fully independent body, funded by its members. Membership is intended in time to include not only robotics companies but also colleges, universities and interested individuals.

● The world's first personal robotics conference will be held in Alberquerque, New Mexico, this week.

Skip Stevely

Spectrum cartridges

PARKER Brothers, the US toy company, will be the first independent company to produce cartridge software for the Sinclair Spectrum.

The first programs will be released in August — a mixture of established titles on other machines such as *Q-bert*, *Popeye* and *Return of the Jedi* and two new home computer titles — *Gyruss* and *Star Wars* (both converted from the original arcade games).

Until now only Sinclair has taken advantage of the facility offered by the ZX Interface II of running plug-in Rom software.

In October last year Sinclair announced, along with the Interface II, a range of 10 cartridge titles — all of which had been previously available on cassette.

A Parker spokesman commented: "We are taking a long term view on the Interface II and we feel it will eventually be successful."

Parker Brothers are known to be particularly concerned by software piracy and this has been one of the factors leading it to launch a range of programs on Rom rather than cassette.

Prices for the cartridges are expected to match Sinclair's own — at around £10. However, Parker's cartridges will use a 16K Rom, unlike Sinclair's which use an 8K Rom.

TV licence case dismissed

MICROCOMPUTER user Peter Battle has established a precedent in the computer world.

Having been charged with having no tv licence, his case was dismissed by Ilkeston magistrates after he explained that he only used the television as a display monitor for his micro.

A Home Office spokesperson explained that if the set is used to receive any tv signal then a licence is needed, but it was up to the courts to decide in individual cases.

Desmond helps teachers

THE Open University has developed an educational computer which, following successful classroom tests, may be adopted by the Microcomputers in Education Programme (MEP) for use in secondary schools.

The micro is one of a number of projects developed for the second phase of the Government's Micros in Education Scheme and was originally designed as a learning aid for teachers.

Desmond (Digital Electronic System Made of Nifty Devices) is now being manufactured by Deltic Automation and costs around £75. It has a 6809 processor, 0.112K Ram, 3.8K Rom and is programmable only in assembly language. The machine is supplied with two programming packs dealing with digital logic and computer architecture.

Although intended as an advanced programming techniques trainer — teaching machine-code — Desmond can also teach control applications. It can be used, for example, to monitor temperature or control light switches.

Church attacks D & D

MICRO owners who play the *Dungeons and Dragons* style of role-playing games are in danger of becoming Satanists. That is the view of a number of American church groups, and now, in Britain, some education authorities have dropped *Dungeons and Dragons* from evening classes.

A Buckinghamshire vicar, Rev John Holltdge, has sent a letter to parents and schools in the area, deploring the use of Satanist symbols in the game. "Satan is real and wants your child's mind," the letter reads.

However, the managing director of TSR (UK), which has been selling the game for 10 years in Britain, says there has been no reported incident of anyone being psychologically disturbed by the game.

No emulator yet

VIDEO VAULT'S remarkable *New Emulator* program which is claimed to allow Spectrum software to be run on the Commodore 64 (see *Popular Computing Weekly* March 29) has still failed to materialise.

Riad Kasser, Video Vault's managing director, has now admitted that a working version of the program — which is priced at £13.95 — will not be ready for another two weeks.

Some industry experts remain sceptical that a Commodore 64 emulator can be made to work successfully with the majority of Spectrum programs.

Still no QL but Sinclair stirs

● PCW's QL order: Week 12

Although, three months on, our QL is still not with us, there are vague signs of stirring at Sinclair.

The company now has a small number of fully-working machines which within a week or so should become available for magazines to evaluate.

Interest from our order is up to approximately £5.80.

Letters

Ban the swap shops

In your March 1 issue you announced the formation of the Society of Software Authors and I have no doubt that pirating will be high on the agenda at the inaugural meeting on May 5. As both author and pro-tem Treasurer of the Society, may I comment?

1) The decision by your magazine banning copier adverts is a bit feeble. Too many have already been sold — the pirates obviously have them — and if they need more, well, copying is, after all, their chosen trade.

2) Tapes snarl up in the best of recorders, often ruining the Side 2 back-up as well. Many suppliers do not even provide this back-up, use cheap tape giving poor loading or fall-out, and are deaf to replacement requests. Making one's own back-up is therefore essential.

3) For some, any protection device is a challenge. It does not necessarily mean that they will pirate the 'broken' tape. Writers and artists study books and paintings to learn technique. Programmers will always try to learn how others achieve certain effects.

4) We will never stop kids swapping copies with friends. In my computerless youth I swapped comics, with never a thought that I was doing the publisher out of a sale. I find many youngsters, liking a copy, go out and buy the original — the copy providing a sale which might not otherwise have been made.

On the other hand, if we could persuade all Clubs and Schools, where the potential for swapping becomes much wider than immediate friends, to ban copying on their premises, we would be some way towards reducing the loss. Perhaps publishers could offer, under suitable written guarantee, free software samples to Clubs or Schools enforcing such bans. The demonstration of these at meetings could be good advertising, since it is so difficult to see before you buy at shops.

5) Organised piracy is far more serious. Commercial pirates, offering copies complete with colour inserts indistinguishable from the original, become a matter for the law and the unfortunate software house so favoured. In the last few months I have answered a number of personal magazine adverts, offering originals for sale or swap. Far too often, the conversation has gone something like this:

Me: You're advertising some cassettes for sale (or swap).
Them: Which micro do you have?
Me: Your advert said Spectrum.
Them: Oh, for the Spectrum we've got ... (a very long list) and we've got *XYZ* coming in next week.
Me: (knowing that *XYZ* is not due to be released until next month) Are these all originals?
Them: Well, some are.
Me: My swaps are original.
Them: That's OK. We'll give you 3 copies for every original.
Me: (in time honoured man ner, I make no excuse and hang up)

Clearly these are organised copying networks. If you disbelieve me, try ringing a few numbers from your own back pages, pretending to be a buyer. Don't you notice the same names and numbers coming up issue after issue?

I conclude you could take a far more practical stand against piracy by refusing all swap and sell adverts for software only. It may penalise the genuine advertiser but they could always join a club or try exhibition Bring and Buy stalls.

Dorene Cox
7 Meadway Court
Whalebone Lane South
Dagenham, Essex

The question of organised, commercial, software piracy is becoming increasingly important. We will obviously do everything we can to help stop piracy.

However, banning all software swap and sale advertisements would not solve the problem and it would punish the innocent as well as the guilty.

If anyone has any evidence of organised copying networks using our pages, please let us know.

Complete control

The debate about the morality/legality of tape copying continues. The points made against tapes designed specifically for copying other people's work are justified and reasonable.

There are other important issues, however, the most important being the rights that we have over our own computers. Like many others I purchase commercial software, not just for games appeal, but because of their quality of programming. I realise why software writers include routines to prevent illegal copying. But many interested computer owners find the inability to examine, study, modify, or simply learn from software they have purchased, very frustrating.

It is in the nature of computer owners to enquire into, and customise programs, and in doing so they expand their own knowledge of their machine, and add to their own enjoyment.

I recently purchased a program called *(S)top secret(s)*, which amongst other features, incorporates a routine which puts me back in full control of my Spectrum. It allows me to *Stop* Basic or machine code programs without them crashing. I've tried it on all my commercial software, and it works. I can now learn from my purchases, without getting a black screen, or a system nervous breakdown. I can now utilise all my computer's functions.

I sympathise with software houses regarding illegal copying, but I would question the right of any person to dictate that certain of the keys on my computer must remain inactive, or even lethal, when I use tapes I have purchased. Professional 'pirates' are not interested in programs like *'(S)top secret(s)'*. They use data copying machines, manufactured by well known 'world-wide' companies. I will not be using the program to make 'illegal' copies, just because the *'Save'* option is now open to me. It is apparent that it was not designed for such a use.

I don't defend any software designed merely to *'Copy'* programs, but I would defend very useful utility programs like *(S)top secret(s)*, which restores my rights over my computer, and allows me to learn, not just play.

C C Mole
1 Stour close
Burntwood
Staffordshire

Back numbers

Recent editions of your magazine have included a series of articles of a program by Paul Sellin, *The Pit*. As I have only the final part of this program to hand, would you please inform me if it is possible to obtain either past numbers of the magazine, including parts 1 and 2 of this program, or a copy of the program itself.

M F Wood
38 St Martins Way
Kirklevington
Yarm
Cleveland TS15 9NR

Back numbers can be obtained by writing to *PCW*, Back Numbers Dept, 12-13 Little Newport St, London, and enclosing 50p per back number. Please remember to write the issue date of the magazine clearly.

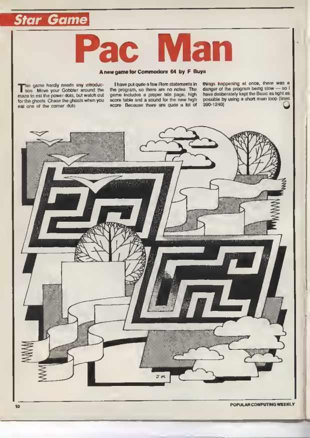

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LONE RAIDER
Encounter
FOR ORIC 48K
NEW
NEW
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ORIC UTILITIES
TRADE ENQUIRIES WELCOME
POPULAR COMPUTING WEEKLY

Pac Man

A new game for Commodore 64 by F Buys

The game hardly needs any introduction. Move your Gobbler around the maze to eat the power dots, but watch out for the ghosts. Chase the ghosts when you eat one of the corner dots.

I have put quite a few Rem statements in the program, so there are no notes. The game includes a proper title page, high score table and a sound for the new high score. Because there are quite a lot of things happening at once, there was a danger of the program being slow — so I have deliberately kept the Basic as tight as possible by using a short main loop (lines 390-1240).



```
100 REM ############
110 REM # PAC-MAN #
120 REM #   BY    #
130 REM # F. BUYS #
140 REM #  1984   #
150 REM ############
160 DIMHM$(400)
170 DIMP(3) G(3) A(3) I(3),J(3) K(3)
180 READP(0) P(1) P(2) P(3) D(0),D(1),D(2),D(3)
190 DATA1 -40 -1,40,-1 -40 1,40
200
210 FORI=1TO25 A$=A$+CHR$(17) NEXT M$=CHR$(19)+A$ FORI=1TO10 SC(I)=0
220 SC$(I)=CHR$(154)+"##"+CHR$(158)+CHR$(18)+"COMMODORE"+CHR$(146)
    +CHR$(154)+"##" NEXT
230
240 REM ### START GAME ###
250
260 PRINT"♥"CHR$(8) SC=0
270 GOSUB1260
280 PRINT"
290 PRINT"##           BY FABIAN BUYS ##"
300 SI$="         DO YOU WANT INSTRUCTIONS ?"
310 PRINTSI$
320 V=PEEK(1024) POKE1063 Y V1=PEEK(55296) POKE55335 V1 FORZ=0TO65 NEXTZ
330 PRINT"] "CHR$(20)
340 GETE$ IFE$="N"THEN420
350 IFE$="Y"THENPOKE53281 0 GOTO2230
360 B1=B1+1 IFB1=110THENB1=0 GOTO1800
370 GOTO320
380
390 REM ### MAINLOOP ###
400
410 PRINTCHR$(142)
420 JH=64 LK=46 PT=93 RS=32 RU=42 PW=60 RW=81 JL=64 NAME
440 GOSUB1440
450
450 K=32 I=1964 POKEI RW R=0 C=1
460 R(3)=3 K(3)=32 C(3)=8 I(3)=1534
470 M=2 R(2)=2 R(0)=0 R(1)=1 I(0)=1503 I(1)=1309 I(2)=1164
480 K(0)=32 K(1)=32 K(2)=32 C(0)=1 C(1)=3 C(2)=2 MA=300
490 POKEI503 RV IFH=1THENPOKE1309 RV M=4 MA=230
500 IFH=2THENPOKE1164 RV M=5 MA=160
510 IFH=3THENPOKE1534 RV M=6 MA=100
520 IP=VAL(TI$)
530 R2$="####################### STAR"
540 PRINTR2$ PRINTTAB(12)"# IN  "3-VAL(TI$)+IP " SECOND "
550 IFVAL(TI$)-IP<3GOTO540
560 PRINTR2$ PRINTTAB(12)"# IN  1  SECOND  " FORU=1TO1000 NEXT
570 PRINT"######################## SCORE #" PRINTTAB(12 "#
580 PRINTTAB(19)"## HIGH="HI$+STR$(HI)"2""
590 UN=1 PE=56321 GX=12
600 X=UN IFPEEK(PE)=239THENX=M
610 FORW=UNTOX
620 J=I+P(R)
630 L=PEEK(J) IFL<>JLANDL<>RTTHEN660
640 R=R+UN IFR=4THENR=0
650 GOTO620
660 IFR<>LXTHEN750
670 SC=SC+UN IFPT<>MATHENPRINTTAB(GX)"#"SC"#" K=RS GOTO1050
680 H=H+1PRINTTAB(1 "#"SC"#"
690 PRINTTAB(19 " ## WELL DONE# "
700 IFH<4THEN63899
710
720
730
740 GOTO420
750 IFK=RSTHEN1050
760 IFK=RUTHEN1250
770 P=PEEK(PE)
780 IFP=253THENR=2 GOTO640
790 IFP=254THENR=0 GOTO830
800 IFP=251THENR=4 GOTO820
810 IFP=247THENR=6 GOTO830
820 GOTO1050
830 ONR/2GOTO840 860 950 1000
840 IFR=1ORR=3THEN1050
850 IFC=1ANDR=0THEN1050
860 IFC=5ANDR=2THEN1050
870 IFR=0THENJ=I+81 C=C-1 L=PEEK(J) GOTO1050
880 REM ### GET JOYSTICK ###
890 J=I+79 C=C+1 L=PEEK(J) GOTO1030
900 IFR=0ORR=2THEN1050
910 IFC=1ANDR=3THEN1050
920 IFC=5ANDR=1THEN1050
930 IFR=1THENJ=I-42 L=PEEK(J) C=C+1 GOTO1050
940 J=I+42 L=PEEK(J) C=C-1 GOTO1050
950 IFR=0ORR=2THEN1050
960 IFC=1ANDR=1THEN1050
970 IFC=5ANDR=3THEN1050
980 IFR=1THENJ=I-38 L=PEEK(J) C=C-1 GOTO1050
990 J=I+38 L=PEEK(J) C=C+1 GOTO1050
1000 IFR=1ORR=3THEN1050
1010 IFC=1ANDR=2THEN1050
1020 IFC=5ANDR=0THEN1050
1030 IFR=0THENJ=I-81 L=PEEK(J) C=C+1 GOTO1050
1040 J=I+81 L=PEEK(J) C=C-1 GOTO1050
1050 IFR=3THENRW=81 GOTO1100
1060 IFR=0THENRW=81 GOTO1100
1070 IFR=1THENRW=81 GOTO1100
1080 IFR=2THENRW=81 GOTO1100
1090 RW=81
1100 POKEI K POKEJ RW K=L I=J MA=ABS(MA-1) NEXTW
1110 FORB=ZE TO M
1120 J(B)=I(B)+D(R(B))
1130 L(B)=PEEK(J(B)) IFL(B)<>JLANDL(B)<>PTTHEN1160
1140 R(B)=R(B)+UN IFR(B)=4THENR(B)=0
1150 GOTO1120
1160 IFK(B)=RSORK(B)=RUORK(B)=LKTHEN1250
1170 IFK(B)=RWTHEN1260
1180 MW=RW
1190 V=SGN(C-C(B))+2
1200 ONV GOSUB1210,1250,1220
1210 C(B)=C(B)-1 ONR(B)+1GOSUB2150 2160,2170 2180 L(B)
     =PEEK(J(B)) GOTO1230
1220 C(B)=C(B)+1 ONR(B)+1GOSUB2190 2200 2210,2220 L(B)
     =PEEK(J(B)) GOTO1230
1230 POKEI(B) K(B) POKEJ(B) RV I(B)=J(B) K(B)=L(B) NEXTB
1240 GOTO600
1250
1260 REM ### HIGH SCORE ###
1270 IFSC>HITHENHI=SC GOSUB1810 GOSUB1750 GOSUB1270 GOSUB1310
1280 IFPEEK(PE)<>239THEN1280
1290 SC=0 H=0 RESTORE GOTO420
1300 REM ## SCREEN MAKE UP ##
1310 POKE53281,6 POKE53280 6 PRINTCHR$(147) FORT=1TO2 PRINTCHR$(13) NEXT
1320 PRINT"
1330 PRINT"
1340 PRINT"
1350 PRINT"
1360 PRINT"
1370 PRINT"
1380 PRINT"
1390 RETURN
1400 POKE53281 0 FORI=1TO4 PRINT"# "  NEXTI PRINT"#I"
1410
1420 REM ### SET UP SCREEN ###
1430
1440 POKE53281,0 PRINT"♥"
1450 PRINT"♥
1460 PRINT"
1470 PRINT"
1480 PRINT"
1490 PRINT"
1500 PRINT"
1510 PRINT"
1520 PRINT"
1530 PRINT"
1540 PRINT"
1550 PRINT"
1560 PRINT"                  ( # PAC-MAN ## # # # #     "
1570 PRINT"
1580 PRINT"
1590 PRINT"
1600 PRINT"
1610 PRINT"
1620 PRINT"
1630 PRINT"
1640 PRINT"
1650 PRINT"
1660 PRINT"
1670 PRINT"
1680 PRINT"
1690 PRINT
1700 POKE2023 75 POKE56295 14 RETURN
1710 REM ### INPUT HIGH SCORE ###
1720 PRINT"♥" GOTO1900
1730 PRINT"♥###########"
1740 RETURN
1750 REM ### HIGH SCORE SOUND ###
1760 POKE54296 15
1770 POKE54276 0 POKE54272 0 POKE54273 0 POKE54277 0 POKE54278 200
1780 POKE54276 33
1790 FORZ=2TO17 POKE53280 Z FORZ1=1TO15 POKE54273 Z*Z1 NEXTZ1 Z
1800 POKE54276 0 RETURN
1810 PRINT"♥"
1820 POKE53281 6
1830 FORI=1TO11
1840 PRINT"# HIGH SCORE                   HIGH SCORE#"
1850 NEXT
1860 PRINT"# HIGH SCORE                   HIGH SCORE#"
1870 RETURN
1880
1890 REM ### SCORE TABEL ###
1900
1910 PRINT"♥"
1920 Z=0 FORT=1TO10 IFSC>SC(T)THENZ=T T=11
1930 NEXT IFZ=0THEN2030
1940 PRINTLEFT$(A$ 7 SPC(9)CHR$(154)"ENTER TEXT FOR SCORE TABLE"
1950 PRINTLEFT$(A$ 13)SPC(11)"NAME           ........"
1960 FORI=1TO11 PRINTCHR$(157   NEXT PRINTCHR$(31)  INPUT"#" N$
1970 IFLEN(N$)>11THENN$=LEFT$(N$ 11)
1980 FORT=1TO11 Z$=MID$(N$ T 1) IFZ$=CHR$(46 THENN$=LEFT$(N$ T-1)
1990 NEXT
2000 IFZ=0THEN2030
2010 FORT=9TOZSTEP-1 SC(T+1)=SC(T) SC$(T+1)=SC$(T) NEXT
2020
2030
2040 SC(Z)=SC SC$(Z)=CHR$(29)+CHR$(29)+CHR$(29)+CHR$(32)+N$+CHR$(32)
2050 REM ### SCORE TABEL ###
2060 PRINTCHR$(147 TAB(12)CHR$(154)"##"CHR$(30)"SCORE TABEL"CHR$(154)
     "##"CHR$(17)
2070 FORT=1TO10
2080 PRINTCHR$(30)CHR$(17)" PACER   T TAB(12)CHR$(5) SC(T) TAB
     (22)CHR$(158) SC$(T) NEXT
2090 PRINTLEFT$(A$ 25)SPC(8)
2100 GETA$
2110 IFB1=130THENB1=0 GOTO260
2120 IFA$=""THENB1=B1+1 GOTO2100
2130 SC=0
2140 GOTO260
2150 J(B)=I(B)+79 RETURN
2160 J(B)=I(B)-42 RETURN
2170 J(B)=I(B)-79 RETURN
2180 J(B)=I(B)+42 RETURN
2190 J(B)=I(B)-81 RETURN
2200 J(B)=I(B)-38 RETURN
2210 J(B)=I(B)+81 RETURN
2220 J(B)=I(B)+38 RETURN
2230 PRINTCHR$(147) PRINTCHR$(8) PRINTCHR$(14) PRINTCHR$(9
2240 MN$="THE OBJECT OF THE GAME IS TO EAT" GOSUB2310
2250 MN$="AS MANY AS POSSIBLE POINTS." GOSUB2310
2260 MN$=" YOU CAN GO FASTER WHEN YOU PRESS " GOSUB2310
2270 MN$="# THE BUTTON# YOU CAN CHANGE OF" GOSUB2310
2280 MN$="DIRECTION WHEN YOU ARE ON A  #  " GOSUB2310
2290 GETR$ IFR$=""THEN2290
2300 GOTO260
2310 FORY=1TOLEN(MN$)
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Every which way but . . .

Christina Erskine goes back to school in order to learn about educational software

Those who decry educational software as not being worth the tape it's written on should perhaps take into account a company who has successfully been writing for schools since 1979, and only recently broadened into the retail market

Five Ways Software of Birmingham began with a minicomputer in the maths department of King Edwards Five Ways school and an enthusiastic maths teacher Tony Clements

"When minicomputers began to be taken over by micros we started fund-raising in order to upgrade ours " explained Tony "We were about a quarter of the way there when the Government announced the MEP programme They granted us the rest of the money, which meant we were able to take on two full-time programmers "

The school's governors then bought two Portakabins to house the micros in the playground As the MEP were keen that projects such as Five Ways should become self-supporting, the work expanded to the extent that in January 1983 Five Ways Software — and Tony Clements now an ex-maths teacher — moved out of the playground and into office premises in Northfield with 18 full time staff

Having moved Five Ways were gradually decreasing the amount of work directly produced for the MEP, and in reverse order to many companies beginning to produce software for the primary sector

"We began working closely with the Dudley Education Authority to produce programs for primary schools on the Research Machines 480Z micro " said Tony "We used head teachers and educational consultants to provide the design and expertise

From our experience, I'd say that programs for a younger age group present far more of a challenge than for secondary schools Partly because there's much more competition but mainly because it's difficult to use the full power of the computer for a six year-old child's program "

By September 1983 Five Ways had outgrown its Northfield premises, and moved again, to its present building, which houses 40 full time staff

Tony Clements began looking at the possibilities of software for the retail market Through Heinemann, the publishers, a number of primary programs for schools were converted for home use The latest of these is the *Learning Box* series

The series consists of eight programs designed for children between the ages of three and eight each one based around a well-known story or nursery rhyme

But Five Ways has taken care that the packaging and additional details are also suitable for that age group

"Each program contains a story book and also a parents guide explaining how to get the most out of it We also use an overlay for the keyboard, so that instead of having to press a particular key the child will only have to press any key in say the pink or blue area of the overlay

"We also tested the box the programs came in fairly rigorously It's made of tough plastic and, after an extensive period of extremely rough treatment showed no signs of breaking "

So far, all the retail programs are for the Spectrum only, but Five Ways plan to convert to other computers

"I'm also looking forward to the arrival of the QL, and we'll certainly be moving up to it when it appears Its extra power will give us a new challenge in writing software "

Five Ways are currently going through a period of consolidation rather than growth Its work is fairly equally divided between programs originated and produced entirely by Five Ways and work contracted to them

Having expanded and diversified fairly rapidly over the last 15 months, Tony Clements is now analysing the progress made and looking at ways to improve efficiency and quality before seeking fresh growth areas

"We are definitely planning to expand geographically At the moment we're selling predominantly to the British market but we want to sell to the US and the Continent — we're looking into the idea of doing programs in European languages

"I think too that Britain is soon going to be 'caught up' in terms of the quality of its computer products At the moment we're streets ahead in terms of the quality of our software, but very weak, I believe in terms of marketing vigour

Current projects underway at Five Ways include an arcade style game aimed to teach the value of nutrition, a lathe control program for O Level/CSE standard and, for the same age group a program which allows the user to design the front page of a newspaper

The arcade game shows a *Pacman* type character who must eat certain foods in his path in order to stay alive and is designed for the 8-12 year old age group Now in the trial stage it is planned to be available retail in May

The newspaper page and the lathe control programs are both MEP subsidised and will be for use in schools

The newspaper program works with a simulated word processor Having typed in a story, you can move the space for it around on the front page display and select from four different type sizes The program will tell whether you need to edit the story to fit and how much by

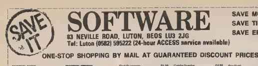
Every Five Ways program is worked on simultaneously by two to four people one of whom will assume responsibility as project leader for the particular work The majority of the programmers at Five Ways are post-'A Level students, taking their 'year off' before going to college or university, although there are a small number of permanent programmers

"This is a quite deliberate policy " said Tony "Many of them have no previous programming experience, nor are they planning a career in it

"But it does mean that we have a steady flow of fresh talent and imagination running through the firm and hopefully the ideas don't get stale

"Generally speaking they don't come back here after finishing their academic education, although we do have one permanent programmer who started while taking her year off "

Tony Clements — ex-maths teacher, now head of Five Ways Software



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Foreword to the prolog

***Andy Pennell** explains the Artificial Intelligence of Micro-prolog*

Micro-prolog is based on one of the new languages for the next generation of intelligent computers and is now available for the 48K Spectrum It is supplied on cassette in a presentation box, together with a slim introductory manual, and a substantial 300 page mini-book, entitled *Micro-prolog Primer*

The introductory book explains how to *Load* the program and how to *Load* the supplement to it called Simple The Simple addition is necessary to introduce the Prolog concepts in an easy-to-use way which it does very successfully The booklet introduces line entering editing and simple concepts This is done well as Prolog is very different from any other language

Prolog works by using a database of information and definitions, forming a complete dictionary For example if you wanted to investigate a family tree, you could start by typing in add*(john father-of simon)* and *add(mary mother-of simon)* which add to the database the information regarding Simon's parents Micro-prolog does not know anything apart from what you tell it so to inform it about children, you could enter *add(x child-of y if (y father-of x) or (y mother-of x))*

In this command, *x* and *y* are used as variables, and are used to explain the definition of 'child-of' Having entered this, to see if Simon is a child of Mary, type *is(simon child-of mary)* and Prolog will reply 'yes' If Simon was not a child-of mary Prolog will reply with 'no As well as the *is* enquiry the *which* command can be used to interrogate the information, in, for example *which(x:x father-of simon)* which, in English, means 'find x such that it is the father of Simon', ie Simon's dad and Prolog will respond with *john No (more) answers* in reply

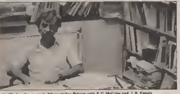
Using just *add*, *is* and *which*, a complex database of information can be entered and examined As Prolog is supposed to de Artificially Intelligent, you may wonder what family trees have to do with it Well one intelligent application would be to enter into the database a robot's environment such as 'chair behind table 'table under window', then the robot could use Prolog to find its way around the defined room

As well as textual data, numeric applications can also be handled by Prolog, up to a large limit of 10^127 The Prolog Primer lists one of the fastest implementations I have seen for factorial calculation, using recursion

The cassette also contains several Prolog programs to be loaded but the function of most remains a mystery — the introductory booklet refers to the Reference Manual, which is not available at the time of writing When trying to load them, I discovered a bug in Micro-Prolog — if as I did you mistype the filename in *Load*, and *Break* into it after realising your mistake, you cannot load anything else When you try, it says 'Evaluation error 6 — *Close* last used file first' I tried typing all manner of *Close* commands but to no avail The only solution I could find was to switch off the machine, and re-load the whole thing

The *Micro-Prolog Primer* is a very compact introduction to Prolog, and gradually leads the reader into all the features of the language but infuriatingly has no index — for a book of over 300 pages, this proved rather a nuisance I would have liked to have used my printer from Prolog which I think is possible, but I couldn't find any reference to the method in any of the literature supplied

Although the Micro-Prolog package may seem expensive to some at £24 95, it does include a book and is at least four times cheaper than the same program on various CP/M machines It is a good introduction with AI languages



Keith Clark, who co-wrote Micro-prolog Primer with F G McCabe and J R Ennals


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Window box

Michael Hoff takes a sneak preview of WH Smith's Games Network

If the figures for computer sales and arcade game takings are anything to go by, *Waldo* 'the Wizard of Games' will have his work cut out when he makes his British television debut.

Waldo is the symbol of The Games Network, the most recent, and perhaps most adventurous of the three cable television games channels. For 24 hours a day, seven days a week, the bearded wonder will present a selection of 20 games on subscribers' television screens, at a cost that is approximately half that of one games cartridge and but a fraction of what arcade game players can spend in a month.

The Games Network is to be launched soon by high street giant WH Smith, whose successful entry into the home computer market, principally with Sinclair products, led to the establishment of a Cable Services division. Its managing director, Francis Baron, is confident of the new venture's success, and predicts that most if not all 11 of the recently franchised multi-channel cable schemes will take the service.

'We're not really too worried about the competition,' he says, 'even though we are not offering TGN to the existing cable operators as their systems are too outdated.'

The channel takes its name from a Los Angeles firm from whom WH Smith have a licence to distribute a 64K Ram microcomputer called The Window, which will be supplied to subscribers upon payment of a monthly connection fee (probably around £10). It is this unit, complete with 6502 microprocessor, which forms the basis for Baron's optimism.

Unlike the Sirius and Sinclair Spectrum micros used with the Gamestar and Micronet channels, The Window was designed with cable television games playing specifically in mind. It provides 280×192 high-resolution colour graphics, complex sound effects delivered on a full video channel, and comes complete with QWERTY keyboard, left and right hand 'Fire' buttons and manoeuvring keys. Joystick and paddle ports are included, as well as a special freeze frame key and a 'talk back' facility for eventual use on two way cable systems.

The games are downloaded from dual computer systems with hard disc storage installed at cable operators' head ends, but as technical manager David Gayler points out, the present loading time provides ample room for expansion. "We're talking about some 10 seconds to load a game, and that gives us an enormous amount of slack,' he says. 'Most of that 10 seconds is empty at the moment, and as we're only filling two or three seconds with actual data, the capacity to take larger and larger games delivered in 64K chunks is quhe considerable.'

Although the final format has yet to be determined, the new channel will offer broad based games programming ranging from the arcade, space battle variety to the more sedate board games and educational exercises. TGN claims it will get the best of the new games, as it pays royalties based on the total number of Games Network subscribers, and because exposure on TGN will increase sales of a game to arcades and home computer and video games machine owners.

The 11 new cable franchises

Name of operator	Area proposed
Merseyside Cablevision	South Liverpool
Rediffusion Consumer Electronics Ltd	Guildford
Swindon Cable	Swindon
Services Ltd Ulster Cablevision	Belfast
Westminster Cable Company	City of Westminster
Aberdeen Cable Services Ltd	Aberdeen
CableTel Communications Ltd	London Borough of Ealing
Clyde Cablevision Ltd	North Glasgow
Coventry Cable Ltd	Coventry
Croydon Cable TV Ltd	London Borough of Croydon
Windsor Television Ltd	Windsor, Slough and Maidenhead

Details of competitions and tips on how to play the games are likely to be provided in a glossy monthly game guide. A feature of both the guide and the channel will be the considerable emphasis placed on educational games, one area where David Gayler expects there to be considerable turnover. 'No one wants to learn four plus four equals eight month after month from the same old fire-breathing dragon,' he says.

The one possible drawback for the Games Network is that having a wizard in your living room is not, as yet, quite like having your own micro. Unlike, for example, the Spectrum used with British Telecom's Gamestar service, you can't hack around inside The Window, nor can you take it over to the neighbours for a casual evening of fun. Each micro is identified by an individual subscriber number and an address code unique to his or her branch of any given cable system. Software pirates will find that data sent down the cable is not only scrambled but protected along its communication path by devices that prevent any unauthorised access.

The Window may lose out a little from being programmable only via a cable line, but its considerable capacity in relation to the micros on offer from the other games channels will prove to be of considerable advantage with the advent of interactive cable services. WH Smith intends to be a major force in this field and firmly believes that interactive services interfaced with micros like The Window may well prove to be the saviours of the cable operators.

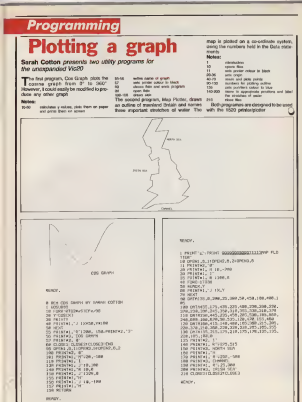
The new Smith's division hopes for a mid-1985 launch date for a range of home shopping, banking, financial and information facilities provided via The Games Network micro, and intends to later add a package of programming services which will use the advanced features of computer-driven two way systems to mix film, sound and text while bringing together entertainment, advertising, information and ordering facilities.

Channels like The Games Network provide not only the all important entertainment layer of the cable revolution, but also the computer hardware necessary to gain access to interactive cable services. People may well take these channels for all the right reasons, but will they be the real reasons too?

'People buy home computers with all sorts of pious intentions about word processing and education,' says David Gayler. 'But the evidence suggests that an astounding proportion simply end up playing games on them.'

The 64K window micro will be supplied to Games Network subscribers


BEYOND
CHALLENGING SOFTWARE
Less than human, far more than mere computer
The Psytron controls the massive Betula 5 Installation. When the attack comes, it will cope with defensive demands which would leave a human brain unhinged, computer circuits scrambled.
Damage in any sector of the base must be assessed and its effect on the fabric of the installation calculated immediately
Human lives will be expended as necessary but if the Psytron ever goes down.
The Sinclair Spectrum has always attracted the best programmers It's always had the most innovative software Psion Scrabble, The Hobbit, Jet Pac and now
PSYTRON
Ten screens of stunning graphics, animation which makes other programmers gasp, a 20 page booklet of hints, tips and help with the discovery of each of six levels of play
"How long can you survive the Final Conflict? A true Psytron would last an hour and a Sinclair Q.L. goes to the first person to match that feat"



Plotting a graph

Sarah Cotton *presents two utility programs for the unexpanded Vic20*

The first program, Cos Graph plots the cosine graph from 0° to 360° However, it could easily be modified to produce any other graph

Notes:

10-50	calculates y values, plots them on paper and prints them on screen
55-56	writes name of graph
57	sets printer colour to black
60	closes file and ends program
99	open file
100-158	draws axis

The second program, Map Plotter, draws an outline of mainland Britain and names three important stretches of water The map is plotted on a co-ordinate system, using the numbers held in the Data statements

Notes:

1	introduction
10	opens files
11	sets printer colour to black
20-35	sets origin
40-70	reads and plots points
90-130	numbers for plotting outline
135	sets printers colour to blue
140-200	move to appropriate positions and label the stretches of water
210	close files

Both programes are designed to be used with the 1520 printer/plotter

```
COS GRAPH

READY.

0 REM COS GRAPH BY SARAH COTTON
1 GOSUB99
10 FORX=0TO2*πSTEPπ/90
20 Y=COS(X)
30 PRINTY
40 PRINT#1,"J";X*50,Y*100
50 NEXT
55 PRINT#1,"R";200, 150:PRINT#2,"3"
56 PRINT#3,"COS GRAPH
57 PRINT#2,"0"
60 CLOSE1:CLOSE2:CLOSE3:END
99 OPEN1,6,1:OPEN3,6:OPEN2,6,2
100 PRINT#2,"0"
101 PRINT#1,"M";20,-100
110 PRINT#1,"I
130 PRINT#1,"J";0,100
140 PRINT#1,"R";0,0
150 PRINT#1,"J";320,0
155 PRINT#1,"H"
156 PRINT#1,"J";0,-100
157 PRINT#1,"H"
158 RETURN

READY.
```

```
READY.

1 PRINT"☐":PRINT"QQQQQQQQQQQ]]]]]MAP PLOTTER"
10 OPEN1,6,1:OPEN2,6,2:OPEN3,6
11 PRINT#2,"0"
20 PRINT#1,"M";10,-700
30 PRINT#1,"I"
35 PRINT#1,"R";100,0
40 FORC=1TO38
50 READX,Y
60 PRINT#1,"J";X,Y
70 NEXT
90 DATA135,0,200,35,300,50,450,100,400,105
100 DATA455,175,435,225,400,230,390,220,370,230,390,245,350,310,355,330,310,370
110 DATA290,445,235,450,285,530,185,580,240,680,100,670,50,535,120,470,155,400
120 DATA100,415,140,400,185,360,215,305,220,370,210,360,220,320,220,265,165,255
130 DATA155,215,175,210,175,170,135,135,220,105,100,0
135 PRINT#2,"1"
140 PRINT#1,"R";275,515
150 PRINT#3,"NORTH SEA
160 PRINT#1,"H
170 PRINT#1,"R";250,-500
180 PRINT#3,"CHANNEL
190 PRINT#1,"R";25,300
200 PRINT#3,"IRISH SEA"
210 CLOSE1:CLOSE2:CLOSE3

READY.
```


CODENAME
MAT
MAT
MICROMEGA.
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HAUNTED HEDGES
STARCLASH
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for the
16K or 48K
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John Menzies
spectrum

Relatively speaking

***Pete Gerrard** explains how to compile a relative file in the second of his series on the Commodore disc drive*

Last week we took a brief look at sequential files and how to write them, but to get the most out of your Commodore disc drive you'll need, at some point to start learning about relative files Over the next couple of weeks that's precisely what we'll be talking about

Relative files allow direct access to the information stored in them rather than wading through a whole lot of other data before you get to the particular bit that you want

The usual analogy here is with a record player and a cassette deck. On a cassette deck you have to wind through all the rest of the records to get to whichever track you want to play With a record player you simply lift up the arm and place it down wherever you want it to go

Commodore's disc drives have one great advantage over a lot of others in that they are intelligent, and require no memory from the computer itself they have their own memory, and their own chips inside to handle a lot of tasks

It is a lot easier to write a sequential file than it is to write a relative one However all the commands that allow you to write relative files are built into the computer, and provided you know what they are and how they work it becomes a comparatively easy task to write a direct access system

The terms relative files random files and direct access files are all interchangeable, as they all mean precisely the same thing

Once you know what's going on you'll then be able to build up your own powerful programs as well as possibly understanding the one given away with the free disc when you buy a Commodore disc drive!

In order to write a relative file some understanding of how data is stored on a disc is called for

The information is stored in a series of tracks, and each track is divided up into a series of little boxes called sectors There are a total of 35 tracks on a 1541 disc drive, and the number of sectors depends on the location of the track Tracks near the middle of a disc only have 17 sectors in them, while those at the outside have up to 21 sectors

The total number of sectors on the disc is 690 and the disc itself tells you how many are left vacant on the disc A look at any disc directory will reveal how many sectors, or blocks there are free Since the disc drive itself steals a few sectors for its own use like linking programs together on disc, reminding itself where they all are what they're called how long they are and so on, we get left with 664 for our own use

Each sector can hold up to 255 characters and information is talked of as being in track 5 sector 7 or whatever

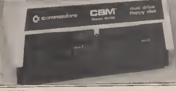
Building up a file

A collection of items of data or information is called a file For example suppose you want to store the surname, first name and telephone number of all your friends in a file held in alphabetical order The information held for each person in the file is called a record, and the bits of information in each record are called items So in the example we have three items of data per record

This could all be held as a sequential file but if you've got a lot of friends, it would take a long time to find the telephone number of someone whose name begins with W If you then wanted another bit of information you'd have to go through the whole file again A tedious procedure

Direct access allows us to specify which sector in which track and starting at which character a particular item of information is to go Provided you keep track of where it's all stored, it can be directly accessed at some later date, without having to go through all the other records

Since you can read and write to specific places on the disc it means that you can also amend any items of information without having to update the whole file which is certainly not the case with sequential files



However if you write your data into sectors which are used by other programs on the disc, those programs will become corrupted Thus it makes sense to have one program disc and one data disc for direct access and not to mix the two

When using direct access a fixed length for each item of information in the record is normally specified Thus the surname item could be 20 characters long, the Christian name 10, and the telephone number 20 Whatever length a name actually is, it will still occupy that much space

It makes it easier to keep track of where all the data is but it unfortunately takes up more room on the disc A small price to pay for having a direct access file

The Components of the System

Since the total number of characters used in this example is 50, it would be possible to maintain five records per sector However we'll keep things simple at this stage and stick to one record per block

The seven stages in writing a direct access file are

1) Open up a route from the 64 to a buffer in the disc unit
2) Copy the record data into that buffer starting at the first character position
3) Find the next available block on the disc
4) Tell the Disc Operating system that you want that block
5) Put all the data from the buffer into it
6) Make an entry in an index array relating the block to the record key which is the index word you use to look up the record details In this case, the surnames of the various people
7) At some later stage, save the index array as a sequential file

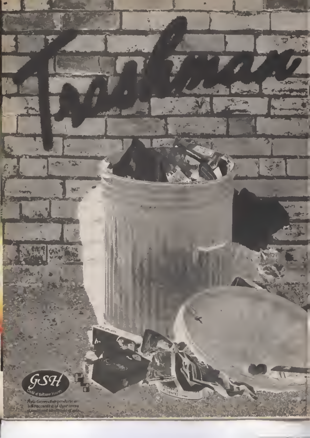
Once you've saved the index that's it, and you can get on with something else To read a record back is a five-stage process

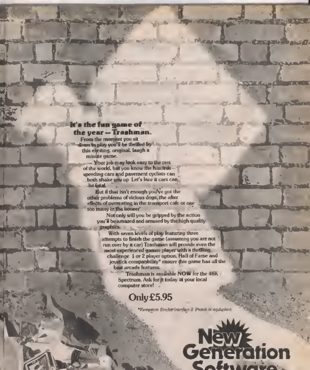
1) Read the index array back into a Basic array
2) Open up a route from the disc buffer to the 64
3) Search the index for the keyword of a required record and note the track and sector numbers associated with it
4) Read the whole of that sector specified from the disc into the buffer
5) Transfer the contents of the buffer into a Basic variable

Finally amending a direct access record is a four stage process

1) Read the whole block into the disc buffer as in 1) to 4) above
2) Point at the part of the buffer to be overwritten
3) Copy the new information from Basic into the buffer overwriting the specified portion of the information in the buffer
4) Write the contents of the buffer back to the block it came from

Next week we'll go into a lot more detail about the steps involved in each of these processes


Trashman
GSH


It's the fun game of the year – Trashman.
From the moment you sit down to play you'll be thrilled by this exciting, original, laugh a minute game.
Your job may look easy to the rest of the world, but you know the hazards – speeding cars and pavement cyclists can both shake you up. Let's face it cars can be fatal.
But if that isn't enough you've got the other problems of vicious dogs, the after effects of overeating in the transport cafe or one too many in the boozer!
Not only will you be gripped by the action you'll be amazed and amused by the high quality graphics.
With seven levels of play featuring three attempts to finish the game (assuming you are not run over by a car) Trashman will provide even the most experienced games player with a thrilling challenge. 1 or 2 player option, Hall of Fame and joystick compatibility* ensure this game has all the best arcade features.
Trashman is available NOW for the 48K Spectrum. Ask for it today at your local computer store!
Only £5.95
*Kempston Sinclair Interface 2 Protek or equivalent.
New Generation Software

Play it again Sam

Mark Lawrance *explains how to emulate an organ*

This program allows the ZX Spectrum to be used as an organ playing the twelve semi-tones from C to B. It does this by using the bottom two rows of the keyboard as if they were the keys of an organ.

The bottom row from Z to M produce the notes C D E,F,G A,B respectively and the second row from S to J excluding F, produce the sharp notes from C to A. If this sounds a little confusing look at page 135 chapter 19 of the Spectrum manual and it should become a little clearer. The F key does not produce a note because there is no E sharp.

The program draws a keyboard, similar to the one on page 135 of the manual but only containing twelve keys, and as each key is pressed the key on the drawing changes colour as in the start of *Manic Miner*, to give the impression of movement.

Once you have created your masterpiece you have the following options — pressing P will play back the tune that you have created pressing R will reset the playback pointer enabling you to start again and pressing Q will return you to Basic. Enter *Goto 20* to return.

Facilities are also provided for saving and loading of a tune. To save start the tape first then press 1. Loading is done by pressing 0 and starting the tape.

The program itself occupies 1000 bytes of machine code but a short Basic program is needed to load and run the code from tape. This is the program titled Organ Basic. Type this program in and *Save "organ" LINE 1* and verify. Then type in the hex loader and run it, inputting 25000 when asked for the start address. Now enter the hex *code* in the listing and *Save "organ code" Code 25000, 1000*. Verify the code and then clear the machine by entering *Randomize USR 0*.

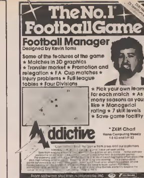
Now, rewind the tape to the start, enter *Load""* and start the tape. The Basic program should then load, auto run, load the *code* and *run* it. If the *code* has been entered correctly you should see a drawing of an organ and a short menu. If you do not get this display you have typed the code in incorrectly and will have to type in the check program to check your *code* against the listing, *Poking* any incorrect entries.

```
              Organ Bas c
>_IST
  10 CLFAF 24999:LOAD ' LJJE 25080
  20 RANDOMI?E JSP 25000


 >                ORGAN CODE
 >
```

```
61A0  11  90  05  ED  53  3A  85  21
61B0  80  40  11  01  40  01  00  18
61B8  38  00  ED  80  01  A0  88  36
61C0  17  ED  80  01  60  02  36  0F
61C8  ED  80  21  2A  40  11  72  64
61D0  06  0E  CD  1D  63  11  80  84
61D8  21  89  40  06  18  CD  1D  63
61E0  21  E0  40  11  90  64  86  17
61E8  CD  1D  83  11  A7  64  21  20
61F0  50  06  11  CD  1D  63  21  40
61F8  50  11  88  64  86  33  CD  1D
6200  63  21  80  50  11  E8  64  88
6208  4F  CD  1D  63  3E  00  D3  FE
6210  3E  07  32  48  5C  21  12  64
6218  22  2D  63  3E  01  32  25  63
6220  21  E9  40  11  42  64  06  10
6228  CD  1D  63  21  09  48  CD  1D
6230  63  21  29  48  CD  1D  63  21
6238  49  48  11  52  64  CD  1D  63
6240  21  69  48  CD  1D  83  21  89
6248  48  CD  1D  63  11  62  64  21
6250  C9  48  CD  1D  63  21  A9  48
6258  CD  1D  63  CD  AE  63  3E  20
6260  32  25  63  21  00  3D  22  2D
6268  63  ED  58  3A  65  DD  21  D6
6270  63  21  00  64  06  0C  CD  E4
6278  62  8E  20  85  CD  AD  62  18
6280  EC  23  DD  23  10  F3  FE  0A
6288  28  22  FE  19  20  85  CD  3F
6290  63  18  DA  FE  0D  20  09  11
6298  90  85  ED  53  3A  65  18  CD
62A0  FE  0F  CA  40  85  FE  14  CA
62A8  67  65  18  C1  C9  F5  3E  0C
62B0  98  12  13  2A  70  5C  A7  ED
62B8  52  20  03  11  3C  85  D5  CD
62C0  78  63  DD  8E  00  DD  66  0C
62C8  DD  5E  18  DD  56  24  DD  E5
62D0  C5  CD  85  03  CD  AE  63  C1
62D8  DD  E1  D1  F1  4F  CD  E4  62
62E0  B9  28  CA  C9  C5  D5  E5  08
62E8  08  11  FE  FE  21  00  00  C5
62F0  D5  C1  ED  78  06  05  C8  47
62F8  28  0C  23  C8  0F  10  F7  C1
6300  C8  02  10  E8  18  E1  C1  7D
6308  E1  D1  C1  C9  F5  C5  D5  E5
6310  00  00  1A  77  13  24  10  FA
6318  E1  D1  C1  F1  C9  F5  C5  D5
```

6320	E5	D5	E5	1A	D6	20	26	00
6328	6F	29	29	29	11	00	3D	19
6330	EB	E1	CD	0C	63	D1	13	23
6338	10	E7	E1	D1	C1	F1	C9	21
6340	90	65	E5	A7	ED	52	20	01
6348	13	E1	06	00	4E	DD	21	D6
6350	63	DD	09	CD	78	63	E5	DD
6358	E5	D5	DD	6E	00	DD	66	0C
6360	DD	5E	18	DD	56	24	CD	85
6368	63	CD	AE	63	D1	DD	E1	E1
6370	23	E5	ED	52	28	03	E1	18
6378	D1	E1	C9	F5	C5	D5	E5	DD
6380	E5	11	E9	58	01	D5	63	A7
6388	DD	E5	E1	ED	42	7D	D6	06
6390	38	01	2C	3E	10	C8	45	20
6398	02	3E	38	19	06	06	11	1F
63A0	00	77	23	77	19	10	FA	DD
63A8	E1	E1	D1	C1	F1	C9	C5	D5
63B0	E5	21	C9	58	11	20	00	06
63B8	08	C5	E5	06	10	36	38	23
63C0	10	FB	E1	19	C1	10	F2	E1
63C8	D1	C1	C9	D5	C1	ED	53	3A
63D0	65	C9	01	00	01	C9	6A	0C
63D8	83	60	11	C6	80	3D	FF	C4
63E0	8C	57	06	06	05	05	05	04
63E8	04	04	03	03	03	03	1A	1C
63F0	1D	1F	21	23	25	27	29	2C
63F8	2E	31	00	00	00	00	00	00
6400	00	00	00	00	00	00	01	08
6408	02	07	03	04	09	27	22	26
6410	21	25	FE	FE	FE	FE	FE	FE
6418	FE	FE	7F	7F	7F	7F	7F	7F
6420	7F	7F	01	01	01	01	01	01
6428	01	01	80	80	80	80	80	80
6430	80	80	FF	FF	FF	FF	FF	FF
6438	FF	FF	00	00	00	00	00	00
6440	00	00	02	06	02	01	02	01
6448	03	04	02	01	02	01	02	01
6450	06	01	02	06	03	04	03	04
6458	03	04	03	04	03	04	03	04
6460	06	01	02	05	05	05	05	05
6468	05	05	05	05	05	05	05	05
6470	05	01	53	70	65	63	74	72
6478	75	6D	20	4F	72	67	61	6E
6480	42	79	20	4D	61	72	6B	20
6488	4C	61	77	72	65	6E	63	65
6490	55	73	65	20	74	68	65	20
6498	66	6F	6C	6C	6F	77	69	6E
64A0	67	20	6B	65	79	73	3B	51
64A8	20	72	65	74	75	72	6E	20
64B0	74	6F	20	62	61	73	69	63
64B8	5A	20	74	6F	20	4D	20	61
64C0	6E	64	20	53	20	74	6F	20
64C8	4A	20	28	6E	6F	74	20	66
64D0	23	20	6E	6F	74	65	73	20
64D8	50	20	74	6F	20	70	6C	61
64E0	79	20	62	61	63	6B	20	74
64E8	75	6E	65	52	20	74	6F	20
64F0	72	65	73	65	74	20	70	6C
64F8	61	79	62	61	63	6B	20	70
6500	6F	69	6E	74	65	72	2E	20
6508	20	20	20	31	20	74	6F	20
6510	53	61	76	65	20	74	75	6E
6518	65	20	74	6F	20	74	61	70
6520	65	2E	20	20	20	20	20	20
6528	20	20	20	30	20	74	6F	20
6530	6C	6F	61	64	20	74	75	6E
6538	65	2E	A8	65	00	01	02	03
6540	DD	21	3A	65	EB	22	3A	65
6548	DD	E5	E5	11	02	00	AF	37
6550	CD	C2	04	E1	DD	E1	DD	E5
6558	D1	A7	ED	52	23	EB	3E	FF
6560	37	CD	C2	04	C3	AF	61	DD
6568	21	3A	65	11	02	00	AF	37
6570	DD	E5	CD	56	05	DD	E1	2A
6578	3A	65	DD	E5	D1	A7	ED	52
6580	23	EB	3E	FF	37	CD	56	05
6588	C3	AF	61	00	00	00	00	00



ZX81 16K
ZX Spectrum 48K
The No.1* Football Game
Football Manager
Designed by Kevin Toms
Some of the features of the game
* Matches in 3D graphics
* Transfer market * Promotion and relegation * F.A. Cup matches * Injury problems * Full league tables * Four Divisions
* Pick your own team for each match * As many seasons as you like * Managerial rating * 7 skill levels * Save game facility
Addictive
* ZX81 Chart
Home Computing Weekly
From software stockists nationwide inc
Addictive Games

A maze of letters

Ian and Damian Inger present a complicated word puzzle

The player, after reading the instructions, is presented with a maze at the top of the screen which is headed by six letters. The computer then selects a word at random from a data list, which is then displayed at the bottom of the screen as blocks, except for the first and last letters. The player is then asked whether or not he can see the letter he wishes to try at the top of the screen. If the answer to this prompt is "no", another set of six letters are displayed. On answering "Y" to this prompt, an arrow is displayed in the bottom left corner of the maze.

The player types in a string of moves such as "FFFFRRFFFBLRFF" to guide the arrow through the maze towards the guess letter. If this letter is in the word, all occurrences of it are displayed. If the path through the maze is blocked, "E" may be entered in the move string to explode the part of the barrier immediately in front of the arrow.

You can use this a maximum of 3 times. Should the arrow collide with the barrier in the maze, the arrow is lost and the move is terminated. 3 arrows are allowed per game.

The program particularly encourages thinking ahead and to program the machine in a fairly simple way to achieve the end result. When typing the program in, I would suggest that lines 270 and 280 are left out until all the typing errors have been removed. The word list can be expanded easily by increasing the value of the variable at line 520 and entering more data statements at line 570.

```
   10REM
   20REM  Word puzzle
   30REM  (c) Feb 84
   40REM  Ian & Damian Inger
   50REM
   60MODE7
   70PRINTTAB(7,1)CHR$(141)+CHR$(130)+"INSTRUCTIONS"
   80PRINTTAB(7,2)CHR$(141)+CHR$(130)+"INSTRUCTIONS"
   90PRINT
  100PRINTCHR$(131)+"The computer will think of a word"
  110PRINTCHR$(131)+"and just like Hangman, you have to"
  120PRINTCHR$(131)+"guess what it is."
  130PRINT
  140PRINTCHR$(131)+"To get your guess letters, you have to"
  150PRINTCHR$(131)+"guide an arrow through a maze by typing";
     CHR$(131)"F for forwards, B for backwards, R for"
  160PRINTCHR$(131)+"right, or L for left."
  170PRINT
  180PRINTCHR$(131)+"Sometimes, you will find that your path";
     CHR$(131);"through the maze is blocked."
  190PRINTCHR$(131)+"If this happens, use E instead of F to"
  200PRINTCHR$(131)+"move forwards. This will explode the"
  210PRINTCHR$(131)+"square in front of the arrow."
  220PRINT
  230PRINTCHR$(131)+"You have three arrows and three E's."
  240PRINTCHR$(131)+"Good luck."
  250PRINT:PRINT
  260REPEAT:PRINTCHR$(129)+"Press SPACE BAR to start":UNTIL GET=32
  270ON ERROR
  280ON ERROR RUN
  290MODE 1
  300VDU23,1,0;0;0;0;
  310MODE1
  320arrows=3
  330E=3
  340SC=65
  350G$=""
  360VDU23,255,255,255,255,255,255,255,255,255
  370PROCword
  380VDU23 241,0,126,126,126,126,126,126,126
  390VDU23 242,126,126,126,126,126,126,126,0
  400VDU23 243,255,255,255,255,255,255,255,255
  410VDU23 244,0,24,60,126,24,24,24,24
  420PROCgrid
  430PROCbarrier
  440REPEAT
  450PROCletter
  460PROCarrow
  470PROCmovearrow
  480PROCgetletter
  490PROCcheck
  500UNTIL FALSE
  510DEFPROCword
  520P=RND(15)
  530FOR J=0 TO P
  540READ word$
  550NEXT
  560RESTORE
  570DATA CAT,DOG,MOUSE,RABBIT,HORSE,WOLF,FLY,FISH,BIRD,RHINO,LION
  580N=LEN(word$)
  590B$(1)=LEFT$(word$,1)
  600B$(N)=RIGHT$(word$,1)
  610COLOUR128:CLS
  620COLOUR1
  630PRINT:PRINT:PRINT
  640PRINT"I am thinking of a"
  650PRINT
  660PRINT"word"
  670PRINT
  680PRINT"It has ";N;" letters."
  690PRINT:PRINT:PRINT:PRINT
  700COLOUR2
  710PRINT"Press Y when you are"
  720PRINT
  730PRINT"ready to guess it"
  740REPEAT
  750G=GET
  760UNTIL G=89 OR G=121
  770ENDPROC
  780DEFPROCgrid
  790VDU24,0;320;1279;1023;
  800GCOL0,130:CLG
  810VDU28,0,30,19,27
  820COLOUR133:CLS
  830COLOUR
  840FOR X=0 TO 1280 STEP 64
  850MOVE X,320
  860DRAW X,959
  870NEXT
  880FOR Y=320 TO 960 STEP 64
  890MOVE 0,Y
  900DRAW1279,Y
  910NEXT
  920ENDPROC
  930DEFPROCbarrier
  940VDU5
  950GCOL0,1
  960A$=STRING$(5,CHR$(241))
  970B$=STRING$(5,CHR$(242))
  980FOR Y=384 TO 959 STEP 64
  990X=RND(15)*64-64
 1000MOVE X,Y
 1010PRINTA$
 1020MOVE X,Y-32
 1030PRINTB$
 1040NEXT
 1050MOVE 0,Y:PRINTA$
 1060MOVE 0,Y-32:PRINTB$
 1070VDU4:ENDPROC
 1080DEFPROCletter
 1090REPEAT
 1100PROCgetstring
 1110VDU5
 1120GCOL0,2
 1130MOVE 320,1007:PRINTSTRING$(6,CHR$(243))
 1140GCOL0,0
 1150MOVE320,1007:PRINTD$
 1160VDU4
```

continued on page 31 ▶

BBC & Education

◀ continued from page 29

```
1170CLS
1180COLOUR2
1190PRINTTAB(0,1)"CAN YOU SEE THE"
1200PRINT"LETTER YOU NEED?"
1210PRINT
1220COLOUR1
1230PRINT"PRESS "Y" OR "N" "
1240COLOUR4
1250FOR I=1 TO W
1260PRINTTAB(I,6)Q$(I)
1270IF Q$(I)="" THEN PRINTTAB(I,6)CHR$(242)
1280NEXT
1290COLOUR2
1300PRINTTAB(17,4)STRING$(E,"E")
1310PRINTTAB(17,6)STRING$(arrow,CHR$(244));
1320COLOUR4
1330COLOUR4
1340G=GET
1350UNTIL G=89 OR G=121
1360ENDPROC
1370DEFPROCgetstring
1380W$=""
1390FORD=0 TO 7
1400W$=W$+CHR$(RND)
1410S%=S%+1
1420IF S%>=91 THEN S%=65
1430NEXT
1440ENDPROC
1450DEFPROCarrow
1460VDU4:CLS
1470X%=0:Y%=368
1480VDU5
1490GCOL0,0
1500IF POINT(X%+8,368)=1 THEN X%=X%+64 GOTO 1360
1510MOVEX%,Y%:PRINTCHR$(244)
1520VDU4
1530COLOUR3
1540ENDPROC
1550DEFPROCmyvearrow
1560crash=0
1570COLOUR4
1580VDU4
1590FOR I=1 TO 8
1600PRINTTAB(I,6)Q$(I)
1610IF Q$(I)="" THEN PRINTTAB(I,6)CHR$(242)
1620NEXT
1630COLOUR3
1640PRINTTAB(0,1)"ENTER YOUR MOVE"
1650COLOUR2
1660PRINTTAB(17,4)STRING$(E,"E");
1670PRINTTAB(17,6)STRING$(arrow,CHR$(244))
1680COLOUR7
1690INPUTTAB(0,3)M$
1700M=LEN(M$)
1710M=1
1720REPEAT
1730M1$=MID$(M$,M,1)
1740IF M1$="E" OR M1$="e" THEN E=E-1
1750IF ASC(M1$)>90 THEN M1$=CHR$(ASC(M1$)-32)
1760PROCmove
1770IF crash=1 THEN M=9
1780VDU4
1790COLOUR4
1800FORI=1 TO W
1810PRINTTAB(I,6)Q$(I)
1820IF Q$(I)="" THEN PRINTTAB(I,6)CHR$(242)
1830NEXT
1840VDU5
1850M=M+1
1860UNTIL M>9
1870ENDPROC
1880DEFPROCmove
1890VDU5
1900GCOL0,0:MOVEX%,Y%:PRINTCHR$(244)
1910GCOL0,2
1920IF M1$="F" THEN Y%=Y%+64:IF Y%>1000 THEN Y%=1000
1930IF M1$="B" THEN Y%=Y%-64:IF Y%<368 THEN Y%=368
1940IF M1$="L" THEN X%=X%-64:IF X%<0 THEN X%=0
1950IF M1$="R" THEN X%=X%+64:IF X%>1216 THEN X%=1216
1960IF M1$="E" THEN PROCexplode:Y%=Y%+64
1970MOVE X%,Y%:PRINTCHR$(244)
1980SOUND0 -15 16,3
1990TIME=0:REPEAT UNTIL TIME>30
2000IF POINT(X%+8,Y%+8)=1 THEN VDU4:PROCcrash:crash=1
2010ENDPROC
2020DEFPROCgetletter
2030ANS=""
2040IF Y%<1007 THEN ENDPROC
2050P=X%-320
2060PS=P/64
2070ANS=MID$(W$,PS+1,1)
2080VDU4
2090ENDPROC
2100DEFPROCcheck
2110IF ANS="" THEN ENDPROC
2120VDU4
2130G$=""
2140FORV=1 TO W-1
2150I=INSTR(word$,ANS,V)
2160Q$(I)=ANS
2170NEXT
2180FOR I=1 TO W
2190G$=G$+Q$(I)
2200NEXT
2210IF G$=word$ THEN PROCanz
2220VDU5
2230ENDPROC
2240DEFPROCcrash
2250arrow=arrow-1
2260VDU5
2270CLS
2280PRINTTAB(0,2)"YOU CRASHED "
2290SOUND0 15 100 30
2300VDU5
2310FOR D=0 TO 20
2320TIME=0:REPEAT:UNTIL TIME=5
2330C=RND(16)
2340GCOL0 C
2350MOVEX%,Y%
2360PRINTCHR$(244)
2370NEXT
2380VDU5
2390GCOL0,1
2400MOVEX%,Y%
2410PRINTCHR$(244)
2420ANS=""
2430IF arrow=0 THEN PROCfailed
2440ENDPROC
2450DEFPROCanz
2460VDU4
2470CLS
2480PRINTTAB(0,3)"YOU WIN "
2490PRINTTAB(0,3)"IT WAS " W$
2500PRINTTAB(0,5)"ANOTHER GO?"
2510G=GET
2520IF G=89 THEN RUN ELSE CLS:CLS:END
2530ENDPROC
2540DEFPROCexplode
2550IF E<0 THEN PROCcrash ENDPROC
2560SOUND0 -15,100,9
2570VDU5
2580MOVEX% Y%+80
2590GCOL0 2
2600PRINTCHR$(241)
2610MOVEX% Y%+40
2620PRINTCHR$(242)
2630ENDPROC
2640DEFPROCfailed
2650VDU4
2660CLS
2670COLOUR1
2680PRINT:PRINT"I won!"
2690PRINT
2700PRINT"It was " word$
2710COLOUR3
2720PRINTTAB(0 5)"ANOTHER GO?"
2730G=GET
2740IF G=89 THEN RUN ELSE CLS:CLS:END
2750ENDPROC
```


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SECOND ISSUE ON SALE 19th APRIL: 85p

Inside the 6809

Jason Orbaum and Geoffrey Campbell *look at the internal organisation of the 6809 in the second part of their series on assembly language*

Last week we left you with a couple of programs, which we will now explain.

Listing one displayed the whole character set by *Poking* into the text screen area. A few eagle-eyed people probably noticed that this is different to the character set attained by entering *For N=0 To 255 Print Chr$(N) Next N* This is due to the absence of control codes. The only difference that this gives is that for all the characters available from the keyboard, there is an inverse. Try getting an inverse space from characters 0-127 without using *Poke*.

Before going into listing two, it is necessary to have a reasonably good knowledge of the binary numbering system. This will help with assembly programming in future articles as well.

In the decimal numbering system, the number 12345 represents

1*10000 + 2*1000 + 3*100 + 4*10 + 5*1

These represent the powers of 10, so that our number becomes

(1*ten to the power 4) + (2*ten to the power 3) + (3*ten to the power 2) + (4*ten to the power 1) + (5*ten to the power 0)

Note that, in the last bracket of the expression 10 to the power 0 is equal to 1. The binary number system works in the same way but each digit is a power of two instead of ten. Just as the highest value a

INTERNAL ORGANIZATION OF THE 6809

E	F	H	I	N	Z	V	C	CC

THE CONDITION CODE REGISTER (CC)

single base ten (decimal) digit can hold is 9, so the highest value a single base 2 (binary) digit can hold is 1. Therefore, any binary number is going to be a string of ones and zeros.

An example of this is the number 10110001B (the B denotes a binary number). This represents

1*128 + 0*64 + 1*32 + 1*16 + 0*8 + 0*4 + 0*2 + 1*1
177

or to put it in a more familiar form

(1*two to the power 7) + (0*two to the power 6)
+ (1*two to the power 5) + (1*two to the power 4)
+ (0*two to the power 3) + (0*two to the power 2)
+ (0*two to the power 1) + (1*two to the power 0)

This is relevant to the hi-res Program given last week as in Pmode 4, the picture is held as a set of binary numbers. Each bit (binary digit) represents one pixel (picture element) and so Poking different numbers into the hi-res screen locations produces different combinations of eight pixels, as there are eight pixels held in one memory byte (group of eight bits). If a particular bit is set to one the pixel is set to white and if it is set to zero, the pixel is set to black.

Thus it can be seen that listing two *Pokes* all possible combinations (in Pmode 4) of eight pixels to the hi-res screen. Now we will leave hi-res until a later article.

The processor at the heart of the Dragon is a very complex piece of electronics engineering, and an understanding of roughly how it works is a great aid to writing efficient assembly code.

Diagram one shows the internal organisation of the 6809E. Starting from the top left and working down to the bottom right, we have

The *Internal Data Bus* — is a set of eight "wires" (silicon etchings), which carry data in sets of eight or 16 bits, ie one or two bytes. In this case it carries one byte from a register to the ALU (Arithmetic Logic Unit), or vice versa.

A *Buffer* — this is a link to the outside world, and none of them need be considered here, as they are used for *Input/Output* operations.

The *Registers* — these hold numbers, in groups of eight or 16 bits. They are

PC — The Program Counter. This holds the address of the next instruction to be executed.

U — The User Stack. A stack should be treated as a pile of numbers and therefore the only number that can be taken from it is the last one put on the top. This is called a Filo (First In Last Out) structure. This is a double — precision register which means it can hold a 16-bit number.

S — The System Stack. This is similar to the User Stack but it is occasionally used by the system as the name suggests.

X — One of the Index Registers. This will be explained later in the article on addressing modes.

Y — The other Index Register.

DP — The Direct Page register is an eight-bit register used to address pages of memory. A page is simply a block of 256 bytes. Thus, memory locations 0-255 are page 0. Since the addresses go up to 65535, there are 256 pages (0-255).

A — The A register is an eight-bit register, and is used in all the arithmetic functions. It can be combined with the B register to produce the 16-bit D register. The D register has B as the low byte (the eight bits with least value on the right of the number).

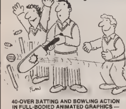
The *ALU* — This performs all the arithmetic functions for the processor. It has inputs and outputs from and to all the registers, including the CC (Condition Code) register.

The *CC* — This is, really, an eight-bit register but it is used to display the status of the registers after the arithmetic functions.

The *Internal Address Bus* — This is a 16-bit bus to transfer addresses from the registers out to Ram, for use in *Read/Write* operations.

The *Instruction Register* — along with the decoder and the controller sequencer, this controls the interpretation of the command.

Next week we will look at a few of the basic commands, and the addressing modes of the 6809.



Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published

Scroller

on Spectrum

This is a machine code utility routine. The routine is to be used in conjunction with readers' screen pictures or within a program they have written. It will scroll the screen up or down a pixel at a time up to 255 pixels each way. This program was written to run on the 48K spectrum but can run with the following changes on 16K

```
LINE 10 CLEAR 31000 etc
        FOR A = 31000 TO 31227 etc
LINE 22   CODE 31000 228
LINE 8500   USR 31000 etc
LINE 8501   USR 31114 etc
```

The reason for this is the way that the memory is allocated to different areas on different machines. When run the program loads the machine code and you have the option to save it. You are then asked two questions which you can decide at the time. The machine code will then scroll the screen up and down the amount you desire from the questions. Your own pictures can be put between lines 50 and 8500. The pokes made are always in the printer buffer. If you want to include the routine in your own programs. Save the program before running it as you could have mistyped some of the data which would cause the computer to crash. If this is so then check through the data statements.

```
   1 REM    Scroller/Roller
   designed and written by
   Chris Kenworthy January 1984
   4 BORDER 2  PAPER 0  INK 7  B
RIGHT 1  OVER 0  FLASH 0  CLS
   5 POKE 23658,8  REM SETS CAPS
 LOCK
  10 CLEAR 64000  RESTORE 9000
FOR a=64000 TO 64227  READ b  PO
KE a,b  NEXT a
  20 PRINT 'Do you want to save
the data?'
  21 LET z$=INKEY$  IF z$="" THE
N GO TO 21
  22 IF z$="Y" THEN SAVE 'Roller
 CODE 64000,228
  30 INPUT 'How many pixels up ?
",a  IF a<=0 OR a>=256 THEN GO
TO 30
  31 INPUT "How many pixels down
 ?",b  IF b<=0 OR b>=256 THEN GO
 TO 31
  40 REM   PUT YOUR SCREEN OR
DRAWING BETWEEN LINE 50 AND 8500
  41 REM HERE IS AN EXAMPLE
  50 INK 6  CLS   CIRCLE 100,100
,50
  51 CIRCLE 100,100,40
  52 CIRCLE 100,100,45
8500 POKE 23296,a  RANDOMIZE USR
 64000  REM POKE IS IN PRINTER
BUFFER
8501 POKE 23296,b  RANDOMIZE USR
 64114  REM POKE IS IN PRINTER
BUFFER
8502 IF INKEY$=""  THEN GO TO 850
0
8503 INK 7  STOP
9000 DATA 58,0,91,71,197,201,3
3,204,91,33,0,91,221,54,2,0,221,
54,1,0,221,54,2,0,235,221,126,0,
203,39,203,39,203,39,221,134,2,1
98,64,103,221,126,1,203,39,203,3
9,203,39,203,39,203,39
9001 REM
9002 DATA 111,229,1,32,0,237,176
 225,221,52,2,221,126,2,254,8,32
,229,221,54,2,0,221,52,1,221,126
,1,254,8,32,195,221,54,1,0,221,5
2,0,221,126,0,254,3,32,181,33,0,
91,17,224,87,1,32,0,237,176
9003 REM
9004 DATA 193,16,147,201,58,200,
91,71,197,221,33,204,91,33,0,91,
221,54,0,2,221,54,1,7,221,54,2,7
,235,221,126,0,203,39,203,39,203
,39,221,134,2,198,64,103,221,126
,1,203,39,203,39,203,39,203,39,2
03,39,111,229,1,32,0,237,176,225
 221,53,2,221,126,2,254,255,32
9005 REM
9006 DATA 209,221,54,2,7,221,53,
1,221,126,1,254,255,32,195,221,5
4,1,7,221,53,0,221,126,0,254,255
,32,181,33,2,91,17,0,64,1,32,0,2
37,176,193,16,147,201
```

Scroller
by Chris Kenworthy

Quadratics

on Vic 20

Utilising the equation given in the program the user inputs values for A, B and C. In certain cases there may be no solutions.

The program includes detailed instructions and aims to be user friendly.

Program Notes

10-121 Screen display and input three values.
130-160 Calculate answers, if any
170-190 Print answers and end display
300-350 No solutions routine
1000-1060 Input beep
2000-2300 Hit any key beep
5000-5460 Instructions
5470-6700 Programming hints. The program is printed on the 1520 plotter printer which cannot handle some characters

Variables

A
B — Input values
C
x — Solution to top part of equation
P,Q — Completed solutions
T MM DD — General variables for loops

```
0 REM  QUADRATICS  BY SARAH COTTON
1 GOSUB5000
2 POKE36878,15
10 PRINT ¤xxxxxxxxxxxxxxxxxxxxxx .
20 PRINT QQSOLUTIONS TO
30 PRINT QAX↑2+BX+C WHERE:
99 PRINT QQA= :
100 INPUTA:IFA 0THEN10
101 GOSUB1000
109 PRINT B= ;
110 INPUTB
111 GOSUB1000
119 PRINT C= :
120 INPUTC
121 GOSUB1000
130 X=B×B-4×A×C
140 IFX<0THEN300
150 Q=(-B-(X↑0.5))/(2×A)
160 P-(-B+(X↑0.5))/(2×A)
170 PRINT ARE X- ;P
180 PRINT OR  X- ;Q
181 PRINT Qxxxxxxxxxxxxxxxxxxxxxx
182 PRINT SQQQQQQQQQQQQQQQQE     HIT AN
Y KEY ;
```

```
183 GOSUB2000
184 PRINT SQQQQQQQQQQQQQQQQ£     HIT AN
Y KEY ;
185 GOSUB2000
186 GETA$
187 FORT=1TO250:NEXT
188 IFA$-  THEN182
189 PRINT ←
190 GOTO10
300 PRINT ±QQ        SORRY!
310 PRINT QQQI CAN'T WORK THAT ONE
320 PRINT Q         OUT.
330 PRINT QQQQ      TRY AGAIN
340 FORT-1TO2500:NEXTT
350 GOTO10
1000 REM
1010 POKE36876,200:POKE36878,15
1020 FORMM=1TO200:NEXTMM
1030 POKE36878,0
1040 FORMM=1TO200:NEXTMM
1050 POKE36878,0
1060 RETURN
2000 POKE36878,15:POKE36876,245
2100 FORT-1TO350:NEXT
2200 POKE36876,0:POKE36878,0
2300 RETURN
5000 PRINT ±QQQQQQQQQQ  QUADRATIC EQUAT
IONS
5010 FORT-1TO2000:NEXTT
5011 PRINT E
5020 PRINT ±THIS PROGRAM IS
5030 PRINT QDESIGNED TO WORK OUT
5040 PRINT QQUADRATIC EQUATIONS
5050 PRINT QUSING THE FORMULA.
5060 PRINT QX=-B+ /*********
5070 PRINT      -: B↑2-4*A*C
5080 PRINT    99999999999999
5090 PRINT  Q       2*A
5091 PRINTCHR$(14)
5100 FORDD-38400TO38686
5110 POKEDD,0
5120 NEXTDD
5130 PRINT Q£     HIT ANY KEY
5140 GETA$:IFA$=  THEN5140
5150 PRINTCHR$(142)
5160 PRINT ±TO SOLVE THE EQUATION
5170 PRINT QYOU ARE REQUIRED TO
5180 PRINT QTO INPUT VALUES FOR
5190 PRINT QA,B AND C.
5200 PRINT QEXAMPLE
5300 PRINT 7777777
5400 PRINT Q↑6X↑2£-2X←-3_0
5410 PRINT Q↑A-6
5420 PRINT Q£B--2
5430 PRINT Q←C--3"
5440 PRINT Qp        HIT ANY KEY
5450 GETA$:IFA$-  THEN5450
5460 RETURN
5470 REM PROGRAMMING INSTRUCTIONS (NO NE
ED TO TYPE THESE IN)
5480 REM  ± =CLR
5490 REM  S =HOME
5500 REM  Q =CRSR DOWN
5510 REM  E =WHITE
5520 REM  £ =RED
5530 REM  ← =BLUE
5540 REM  ↑ -GREEN
5550 REM  _ -PURPLE
5560 REM  p =BLACK
5670 REM SMALL LETTERS INDICATE THAT THE
Y SHOULD BE SHIFTED
5680 REM LINE5060  * -COMMODORE KEY AND
↑
5685 REM LINE5070  . =SHIFT KEY AND @
5690 REM LINE5080  9 =COMMODORE KEY AND
O
5700 REM LINE5300  7 =COMMODORE KEY AND
Y

READY.
```

Quadratics
by Sarah Cotton

Colours

on Dragon

These programs provide a purple colour in pmode 3 screen1,0 by pokeing the value 187 onto the hi-res graphic screen. The colour is made up of alternate blue and red dots. The basic program (a) is very slow so I have included a machine code version (b) which is executed by the basic program (c). For those without assemblers, the row of hex numbers second from the left (reading 8688 8E06 00 etc.) can be poked into the appropriate memory locations. The memory locations are listed in the first row. The numbers go in pairs so that &H86 is poked into memory location &H4E21 and &HGB is poked into memory location &H4E22 etc. You may have noticed that the lines are drawn in yellow. This is because the purple contains both red and blue and the paint wouldn't be able to flow anywhere if the border was either of these.

a

```
10 PMODE3,1:SCREEN1,0.PCLS
20 FOR X=&H600 TO &H1DFF
30 POKE X,187:NEXT
40 DRAW'C2'
50 CIRCLE(128,92),20
60 FOR V=40 TO 100 STEP 20
70 CIRCLE(128,92),V,2
80 NEXT
90 PAINT(100,92),2,2
100 PAINT(80,92),3,2
110 PAINT(60,92),1,2
120 PAINT(40,92),4,2
130 GOTO 130
```

continued on page 43 ▸


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◄continued from page 38

```
b
4E21 86BB        LDA #187
4E23 8E0600      LDX #$600
4E26 A780       LOOP STA ,X+
4E28 8C1E00      CMPX #$1E00
4E2B 26F9        BNE LOOP
4E2D 39          RTS
4E2E

a
10 PMODE3,1:SCREEN1,0:PCLS
20 EXEC &H4E21
30 DRAW C2
40 CIRCLE(128,92),20
50 FOR V=40 TO 100 STEP 20
60 CIRCLE(128,92),V
70 NEXT
80 PAINT(100,92),2,2
90 PAINT(80,92),3,2
100 PAINT(60,92),1,2
110 PAINT(40,92),4,2
120 GOTO 120
```

Colours
by N Smith

Back to Basic

on Spectrum

This program will convert almost all *Machine code* programs back to *Basic*. Type in listing then *save* and *run*. When border flashes load m/c — code must be less than 17K long or it will crash. Longer programs you must stop tape after about 30 seconds.

When screen goes black and *run* appears press *enter* to reveal the basic listing.

```
  2 RESTORE : CLS : DATA 130,16
0,184,148,152,64,140,158,158,162
  3 LET G=16384+32*5
  4 FOR T=0 TO 9: READ A
  6 LET G=G+1
  7 LET A=A/2-32
  8 LET DE=15616+A*8: LET X=0
 10 FOR y=0 TO 32 STEP 32
 11 LET hl=G+y
 12 FOR n=0 TO 7
 13 IF N/2=INT (N/2) THEN LET X
=X+1
 15 LET h=INT (hl/256)
 20 LET l=hl-256*h
 35 LET P=PEEK (DE+X)
 40 POKE hl,P
 42 LET h=h+1: LET hl=l+256*h
100 NEXT n: NEXT y: NEXT t
120 RANDOMIZE USR 5560
130 PAPER 0: RANDOMIZE USR 3435
: PAUSE 25: PAPER 7: RANDOMIZE U
SR 3435: RANDOMIZE USR 4742
```

Back to Basic
by E Duncan-Dunlop

Metronome

on BBC

This program should work on the BBC Micro A or B, any operating system. It simulates the sound produced by a metronome for any speed between 1 and 300 beats per minute.

Program notes
20 Re-run when *Escape* is pressed
40 Define large text window
60 click sound envelope
60-70 title in double height
80-180 Suggested numerical speeds for various tempos and instructions
200 One line only text window
210 Ask for required tempo
220 Do not accept ridiculous tempos
230 Remove flashing text cursor
240-250 Calculate pause between clicks — theoretically 60 should be found instead of 57 but the latter is an adjustment because of the time taken to run the program text for the click.
260-290 Continue sounds until *Escape* is pressed

```
10 REM METRONOME
20 ON ERROR RUN
30 MODE7
40 VDU28,0,23,39,0
50 ENVELOPE1,0,0,0,0,0,0,0,126,-2,0,0,126,110
60 PRINTTAB(9,1);CHR$(141);"M E T R O N O M E"
70 PRINTTAB(9,2);CHR$(141);"M E T R O N O M E"
80 PRINTTAB(4,5);CHR$(129);"Grave=38";SPC(10);"Moderato= 87"
90 PRINTTAB(4,6);CHR$(130);"Largo=45";SPC(8);"Allegretto=100"
100 PRINTTAB(4,7);CHR$(130);"Lento=51";SPC(11);"Andante=110"
110 PRINTTAB(3,8);CHR$(130);"Adagio=58";SPC(13);"Allegro=130"
120 PRINTTAB(0,9);CHR$(130);"Larghetto=59";SPC(5);"Allegro assai=143"
130 PRINTTAB(2,10);CHR$(130);"Andante=68";SPC(4);"Allegro vivace=152"
140 PRINTTAB(0,11);CHR$(130);"Andantino=80";SPC(12);"Vivace=159"
150 PRINTTAB(0,12);CHR$(130);"Sostenuto=74";SPC(12);"Presto=183"
160 PRINTTAB(3,13);CHR$(130);"Comodo=78";SPC(7);"Prestissimo=207"
170 PRINTTAB(1,14);CHR$(130);"Maestoso=83"
180 PRINTTAB(0,23);CHR$(129);"To stop hit  ESCAPE "
190 PRINTTAB(0,17);"Enter the required speed (as a number)  then press  RETURN "
200 VDU 28,0,21,39,21
210 INPUTTAB(5)"NEXT= "T
220 IF T<1 OR T>300 THEN CLS GOTO 210
230 VDU 23;10,32,0;0;0;
240 T=57/T
250 A=T*20
260 REPEAT
270   SOUND1 1,-15,1
280   SOUND1 0 0,A
290   UNTIL FALSE
290 190
```

Metronome
by J Wilson

Variable

on Spectrum

This short machine code routine will print out all the variables in a Basic program. Variables held in the Spectrum are of six different types as explained in Chapter 24 of the manual. The first byte of each variable coding defines which type it is and the byte is used in the following machine code routine which prints on the screen all of the variables defined in any *Basic* program. The six types of variables are as follows:

1 Single Letter
2 Multiple Letter
3 String
4 Number Array
5 Character Array
6 For/Next Loop

The routine starts by examining the bytes following the address held in the System Variables location 23627/8 (*Vars*) using the first byte of each variable coding to decide which type it is, then printing it on the screen using the *Rst* 16 instruction and the *Rom* routine at 6683 which prints the contents of register BC (if it is less than 10,000). When the routine finds a byte with a value of 128 this signals the end of the variables and the routine returns to Basic.

Single and multiple letter variables are printed out directly, strings are shown with the appropriate letter followed by a $ sign, arrays as *Dim* a (1 2,3 etc) and for/next loops as "*Fn*" with the appropriate letter following.

The machine code routine which is 194 bytes long is given as a decimal dump in 5 byte blocks and may be loaded using any suitable Basic loader at any desired location.

continued on page 45►

Walters

LOOK

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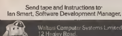
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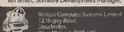
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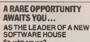
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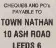
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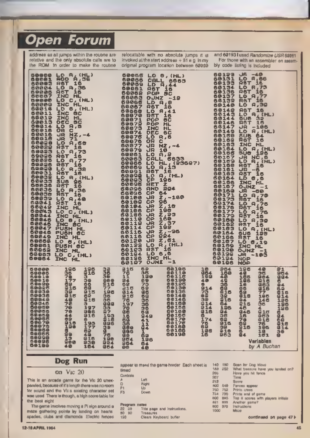
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address as all jumps within the routine are relative and the only absolute calls are to the ROM. In order to make the routine relocatable with no absolute jumps it is invoked at the start address + 81 e.g. In my original program location between 60000 and 60193 I used *Randomize USR 60081*

For those with an assembler an assembly code listing is included

```
60000 LD A,(HL)
60001 ADD A,32
60003 RST 16
60004 LD A,36
60006 RST 16
60007 INC HL
60008 LD C,(HL)
60009 INC HL
60010 LD B,(HL)
60011 INC BC
60012 INC HL
60013 DEC BC
60014 LD A,B
60015 OR C
60016 JR NZ,-4
60018 JR 71
60020 LD A,68
60022 RST 16
60023 LD A,73
60025 RST 16
60026 LD A,77
60028 RST 16
60029 LD A,32
60031 RST 16
60032 LD A,(HL)
60033 SUB 96
60035 RST 16
60036 LD A,36
60038 RST 16
60039 LD A,40
60041 RST 16
60042 INC HL
60043 LD C,(HL)
60044 INC HL
60045 LD B,(HL)
60046 INC BC
60047 PUSH HL
60048 PUSH BC
60049 INC HL
60050 LD B,(HL)
60051 PUSH BC
60052 INC HL
60053 LD C,(HL)
60054 INC HL
60055 LD B,(HL)
60056 CALL 6683
60059 LD A,44
60061 RST 16
60062 POP BC
60063 DJNZ -19
60065 LD A,8
60067 RST 16
60068 LD A,41
60070 RST 16
60071 POP BC
60072 POP HL
60073 INC HL
60074 DEC BC
60075 LD A,B
60076 OR C
60077 JR NZ,-4
60079 JR 10
60081 LD A,2
60083 CALL 5633
60086 LD HL,(23627)
60089 LD A,13
60091 RST 16
60092 LD A,(HL)
60093 CP 128
60095 RET Z
60096 AND 224
60098 CP 64
60100 JR Z,-100
60102 CP 96
60104 JR Z,16
60106 CP 128
60108 JR Z,23
60110 CP 160
60112 JR Z,37
60114 CP 192
60116 JR Z,-96
60118 CP 224
60120 JR Z,61
60122 LD A,(HL)
60123 RST 16
60124 LD B,5
60126 INC HL
60127 DJNZ -1
60129 JR -40
60131 LD A,68
60133 RST 16
60134 LD A,73
60136 RST 16
60137 LD A,77
60139 RST 16
60140 LD A,32
60142 RST 16
60143 LD A,(HL)
60144 SUB 32
60146 RST 16
60147 JR -106
60149 LD A,(HL)
60150 SUB 64
60152 RST 16
60153 INC HL
60154 LD A,(HL)
60155 SUB 128
60157 JR NC,6
60159 LD A,(HL)
60160 RST 16
60161 JR -8
60163 RST 16
60164 LD B,5
60166 INC HL
60167 DJNZ -1
60169 JR -60
60171 LD A,70
60173 RST 16
60174 LD A,79
60176 RST 16
60177 LD A,82
60179 RST 16
60180 LD A,32
60182 RST 16
60183 LD A,(HL)
60184 SUB 160
60186 RST 16
60187 LD B,19
60189 INC HL
60190 DJNZ -1
60192 JR -103
60194 NOP
60195 NOP
```

60000	126	198	32	215	62	60105	16	254	128	40	21
60005	36	215	35	78	35	60110	254	160	40	35	254
60010	70	3	35	11	120	60115	192	40	158	254	224
60015	177	32	252	24	69	60120	40	49	126	215	6
60020	62	68	215	62	73	60125	5	35	16	253	24
60025	215	62	77	215	62	60130	216	62	68	215	62
60030	32	215	126	214	96	60135	73	215	62	77	215
60035	215	62	36	215	62	60140	62	32	215	126	214
60040	40	215	35	78	35	60145	32	215	24	150	126
60045	70	3	229	197	35	60150	214	64	215	35	126
60050	70	197	35	78	35	60155	214	128	48	6	126
60055	70	205	27	26	62	60160	215	24	246	215	6
60060	44	215	193	16	237	60165	5	35	16	253	24
60065	62	8	215	62	41	60170	196	62	70	215	62
60070	215	193	225	35	11	60175	79	215	62	82	215
60075	120	177	32	252	24	60180	62	32	215	126	214
60080	10	62	2	205	1	60185	160	215	6	19	35
60085	22	42	75	92	62	60190	16	253	24	153	0
60090	13	215	126	254	128						
60095	200	230	224	254	64						
60100	40	154	254	96	40						

Variables
by A Buchan

Dog Run

on Vic 20

This is an arcade game for the Vic 20 unexpanded, because of it's length there was no room for sound and the Vic's existing character set was used. There is though, a high score table for the best eight.

The game involves moving a Pi sign around a maze gathering points by landing on hearts, spades, clubs and diamonds. Electric fences appear to mand the game harder. Each sheet is timed.

Controls

A	Left
D	Right
P	Up
F3	Down

Program notes

22-29	Title page and instructions
30-80	Treasures
100	Clears Keyboard buffer
140-180	Scan for Dog Move
189-202	What treasure have you landed on?
205	Have you hit fence
207	Time
212	Score
500-540	Fences appear
750-752	Prints cross
754-790	Prints end of game
800-890	Top 8 scores with players initials
891-899	Another game?
900-970	Instructions
1000	Maze

continued on page 47 ▶



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```
10 REM # DOG RUN #
15 REM # BY K BENT FEB 84 #
20 CLS PRINTCHR$(8) POKE650 220
21 FORN=1TO8 HI$(N)="****" NEXT
22 POKE36879 28
23 PRINT"     DOG RUN          BY K BENT      INSTRUCTIONS (Y/N) ?
*
24 GETA$ IFA$="Y"THEN900
25 IFA$="N"THEN40
26 GOTO24
27 GOTO1000
40 S=7680 SC=0 M=0 Z=1
48 POKES+30720 0 POKES 94
50 FORA=1TO20
55 IFA/5THENC=4 CH=85
57 IFA/2THENC=5 CH=88
58 IFA/10THENC=0 CH=86
59 IFA/15THENC=7 CH=90
60 B=7680+INT(RND(1)*477)+1
70 IFPEEK(B)<>32THEN60
90 POKEB+30720 C POKEB CH NEXT
110 TI$="000000"
120 POKE198 0
130 M=5
140 GETA$
150 IFA$="A"ANDPEEK(S-1)<>160THENS=S-1
160 IFA$="S"ANDPEEK(S+1)<>160THENS=S+1
170 IFA$="W"ANDPEEK(S-22)<>160THENS=S-22
180 IFA$="Z"ANDPEEK(S+22)<>160THENS=S+22
190 IFPEEK(S)=85THENSC=SC+5 M=M+1
195 IFPEEK(S)=86THENSC=SC+10 M=M+1
200 IFPEEK(S)=90THENSC=SC+15 M=M+1
201 IFPEEK(S)=88THENSC=SC+INT(RND(1)*20)+1:M=M+1
202 IFPEEK(S)=102THEN750
207 IFTI$>="000100"THENM=1 GOTO750
210 POKES 32 POKES+30720 0 POKES 94
212 PRINT"     "MID$(TI$,3,2)" "MID$(TI$,5,2)"  "SC
215 IFM=20THEN500
220 GOTO130
500 REM # ELECTRIC FENCES #
510 M=0 Z=Z+1 PRINT"                Z
511 FORA=1TO10
520 B=7747+INT(RND(1)*417)+1
530 IFPEEK(B)=32ORPEEK(B+1)=32THENPOKE(B)+1:GOTO520
535 POKEB+30720 6 POKEB 102
590 NEXT GOTO130
750 REM # DOGING ROUTINE #
751 POKES 32 POKES+30720 2 POKES 86
752 FORP=1TO4000 NEXT
754 POKE36879 220 IFM=1THEN780
755 PRINT"YOU HAVE WALKED INTO  ONE OF THE ELECTRIC"
756 PRINT"FENCES AND WAS KILLED   GOTO780
760 PRINT"YOU HAVE USED UP THE  GIVE TIME GIVEN
780 FORP=1TO4000 NEXT POKE198 0
800 FORIN=1TO8 HS(IN)=HS(IN) HN$(IN)=HI$(IN) NEXT
805 FORIN=1TO8
810 IFSC>HS(IN)ORSC=HS(IN)=SC K=IN:1 IF(IN)THEN815
812 NEXT GOTO890
815 INPUT"     YOU ARE IN THE HALL OF FAME.PLEASE INPUT YOUR INITIALS ";N$
816 N$=LEFT$(N$,3)
820 FORIN=KTO8 HI(IN)=HS(IN-1) HI$(IN)=HI$(IN-1) NEXT
860 PRINT"     HALL OF FAME"
865 PRINT"     ____________"
870 FORIN=1TO8 PRINTHI(IN) HS(IN)
880 PRINT "          "HI$(IN) PRINT
885 NEXT
891 PRINT"ANOTHER GAME  Y/N?  "
892 GETA$
893 IFA$="Y"THEN40
894 IFA$="N"THENEND
895 GOTO892
900 REM # INSTRUCTIONS #
910 FORA=1TO2000 POKE36879 A NEXT
920 PRINT "     MOVE YOUR  DOG" AROUND THE MAZE TO COLLECT    TREASURE FOR POINTS."
930 PRINT "      ■  5 POINTS
931 PRINT "      ■  0 POINTS"
932 PRINT "      ■  15 POINTS
934 PRINT"       ■  MYSTERY
935 PRINT"     AFTER THE FIRST SHEET ELECTRIC FENCES (■)   APPEAR AVOID TOUCHING THE
M.
940 PRINT"YOU HAVE 1 MINUTE TO CLEAR EACH SHEET" "
970 PRINT"     =LEFT        RIGHT= UP,DOWN             #3
985 PRINT "  ■  PRESS F  TO PLAY
```

continued on page 51 ›



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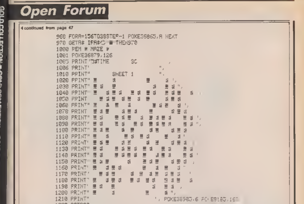


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continued from page 47

```
960 FORA=156TO38STEP-1 POKE36865,A NEXT
970 GETA$ IFA$<> ■ THEN970
1000 REM * MAZE *
1001 POKE36879,126
1005 PRINT"■TIME        SC          ",
1006 PRINT"                         ",
1010 PRINT"       SHEET 1           ".
1020 PRINT" ■    ■        ■     ■ ",
1030 PRINT" ■ ■   ■           ■   ■ ■ ",
1040 PRINT" ■   ■ ■ ■   ■ ■  ■ ■   ■ ■ ■   ■ "
1050 PRINT"    ■ ■ ■  ■ ■   ■ ■     ■ ■ ■
1060 PRINT" ■   ■  ■    ■         ■ ■ ■   ■ ",
1070 PRINT" ■ ■ ■     ■ ■ ■    ■      ■ ■ ■
1080 PRINT" ■ ■    ■ ■ ■   ■  ■ ■ ■ ■    ■ ■ ",
1090 PRINT" ■ ■    ■ ■   ■ ■  ■ ■ ■ ■    ■ ■ ",
1100 PRINT" ■ ■ ■     ■  ■      ■ ■     ■ ■ ■
1110 PRINT" ■   ■      ■ ■  ■ ■      ■    ■ "
1120 PRINT" ■ ■ ■     ■ ■      ■  ■     ■ ■ ■
1130 PRINT" ■ ■    ■ ■ ■ ■  ■ ■    ■ ■     ■ ■
1140 PRINT" ■ ■    ■ ■ ■ ■  ■     ■ ■ ■    ■ ■ "
1150 PRINT" ■ ■ ■        ■     ■ ■ ■     ■ ■ ■  ,
1160 PRINT" ■    ■ ■ ■        ■    ■  ■    ■ "
1170 PRINT"    ■ ■ ■      ■  ■  ■ ■  ■ ■ ■    "
1180 PRINT" ■    ■ ■ ■    ■ ■  ■ ■   ■ ■ ■    ■
1190 PRINT" ■ ■   ■              ■  ■ ■  ,
1200 PRINT" ■     ■           ■    ■ ",
1210 PRINT"                       ", POKE36903,6 FO EB18J,16
1220 GOTO30
```

Dog Run
by K Dent

Microradio

GW6JJN

Radio software index

Many of the letters received at Microradio have a common theme in that many of you are looking for Radio Software for your specific computer. This week I will devote part of Microradio to compiling an idex for Morse and RTTY programme suppliers so that, for the most popular micros, you will know where to look.

Some of you complain of not seeing any advertisements for radio software. The best thing to do is to watch the Classified section of this magazine *Popular Computing Weekly* is the only magazine that has a regular radio-computing column so it seems to me to be the only logical place to look for ads. Here comes the Microradio Index —

Oric 16/48K Owners contact Vamek Software 11 The Dell Stevenage SG1 1PH
Sinclair Spectrum 48K AMTEC Electronics 25 Wychwood Ave Luton LU2 7HT
Commodore 64 I C S Electronics PO Box 2 Arundel W Sussex BN8 0NX
Dragon Contact M Kerry 22 Grosvenor Road Seaford Sussex
BBC Model B S P Electronics 48 Linby Road Hucknall Nottinghamshire also G O C Software 47 Cranberry Lane, Alsager Stoke-on-Trent

This list should answer most of your queries and of course, if you are a producer or supplier of Radio-Computing software or hardware, then do not hesitate to contact Microradio. The column cannot mention products if I don't know about them.

Kevin Greaves of Queniborough, Leics wrote about problems he was experiencing interfacing his Dragon with a radio transceiver. Apparently sparks were leaping about. Having spoken to Kevin on the radio he has now solved the problem by getting a new power supply — the system now works perfectly. I mention this because interfacing a computer to the outside world can bring problems that can damage the computer thoroughly.

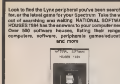
In Kevin's case, the problem was a power supply that he had bought in good faith, only to find it faulty. It is important that you remember that the voltage levels in a microcomputer are often much lower than in equipment that you may wish to connect it to. Voltages much in excess of TTL levels will make your micro's chips go pop.

Experimenting with computers has long been my favourite pastime, but since I am a long way from knowing everything, I have found it invaluable to be a member of a local club or radio-computer user group where a great deal of experience is often available. If you have a local club near you which deals with radio computing, then let me know so that I can pass the information on.

Ray Berry GW6 JJN

[illegible]

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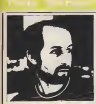
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Tony Bridge's Adventure Corner



This is Letter Week for the Adventure Corner, in which the Grand Elf and I will look at some of your missives.

A couple of weeks ago I mentioned *Lords of Time*, the new Adventure written by Sue Gazzard for Level 9. Atmosphere fairly oozes from the program, and the player really feels lost in another world — or nine other worlds actually, as there are nine "time zones" to be explored, each with their own problems, and problems that cross over into other zones.

Judging from your letters, this new program from Level 9, along with *Snowball* from the same company, is already a very popular Adventure. You may remember that I was stuck at the garden shed — this in my first acquaintance with the Adventure. Several people wrote with hints for me, first Nick Walkland from Sheffield.

"First, may I congratulate you on the best adventure corner in any computer magazine [of course you may, Nick!] — I always turn to it first to see which adventures you are looking at this week. Reading the latest issue, I found that in *Lords Of Time* from Level 9, you were stuck in the garden by the shed. I must not snigger, but I had the same trouble — eventually, I worked it out. To get through the shed door, you must be carrying two short planks (geddit?) and the rope. Using these, cross the river, and then.

ATNI/KESP/"LWA/NKI/
SV*E/DGRL/0APS/PSL

Then get back to the garden and

EW*A/TV0E/"*GL/E0TD/
*EKS/ETY0/SN

Once into the shed, you will find something to help you later, in gathering ingredients for the final formula.

Adventures I have completed

Golden Baton
Hobbit (June 1983)
Mountains of Ket (Can't wait for the next two to win a delicious prize)
Black Crystal
Eye of the Star Warrior (which gave me sore fingers for two days typing!) [Hope you liked it, Nick! — TB] *Dragonsbane* (HA!)
Urban Upstart (which disgusted me as I finished it in just one hour!) [Many people think that this is the best of the Shepherd Adventures, Nick, and I think it's quite ingenious — TB]
Invincible Island

Please answer this question for me on *Arrow of Death* by Digital Fantasia or Channel 8. How do you get into the giant building without tripping up and waking the giant who kills you? Please answer before the TV gets smashed by a mangled, overheated Spectrum!"

I'm afraid that you may have to restrain yourself a little longer, Nick — I don't know the answer to that question, but maybe another reader can write and let me know. For now, let's see if I can help you in *Lords of Time*. If you're still stuck at the plant

-ED*R/00NP/"*RB/000T/
TTSSL

and then

"TAH/TR*0/SWK"/EPLE/EBTB/
0LNE

Now a letter from Patrick Sharkey.

"I am a dedicated fan of Level 9 Adventures and have discovered how to get the keys in the shed in the first time zone (see previous letter). To get the first part of the formula, you will need what you find in the shed.



In exchange I need some help. How in the world do you keep warm in the Ice age? In another adventure — *Colossal Adventure*, also from Level 9 — how do you get the chain from the bear? Sandwiches don't help. Is there any way to get your treasure back from the pirate?

I also have a correction to make. You recently gave a *Colossal* player the answer to the problem of the snake — the answer is slightly different for the Level 9 version. In fact you 'drop' the bird, and the cage is not wicker, but "gilded" (geddit?)

Anyway, your column is wonderful, the best bit in the magazine! Yours, the tooth fairy (alias Palnck Sharkey)"

Thanks for the kind words, Patrick! To help with *Lords of Time*, try this

RFTI/HN0D FTTH/HEEM/ACM/
EMSO/HTEH/ENTO

and then

SPCO/AURR/E000/FTFP/
MEAT/MRMO/0LTT/H0

You'll probably know what to do now! As for the bear, there is no reason why he shouldn't enjoy your sandwiches — do you have the keys yet? As for the Pirate, he's a pesky varmint who will hide the Treasure away in a pretty inaccessible spot. But it can be found with a bit of perseverance!

Stephen Rhodes writes

"I've been meaning to write for some time because, as a keen and often frustrated adventurer, yours is the first article I turn to in *PCW*.

I am stuck in the 3rd time zone in *Lord of Time*. I've managed to lure the T. Rex onto the Allosaurus and waved the mirror at the Brontosaurus, but once I've entered the cave I can't get any further without the cavemen killing me. Any assistance would be greatly appreciated.

On the subject of adventures for beginners, I would recommend *Mountains of Ket* by Incentive Software. The puzzles are logical, relatively easy and the program has a scoring system so you can see how well (or otherwise) you're doing.

May I make a suggestion for your column (help yourself!) — a league table of reader's favourite adventures. This would be of benefit to future buyers and also to yourself in deciding which games to review.

My favourites are

Adventure Quest	Level 9
Lord of Time	Level 9
Golden Apple	Artic
Velnor's Lair	Quicksilva
Mountains of Ket	Incentive"

To your problem in *Lords of Time* you've got the right idea with the mirror but try this

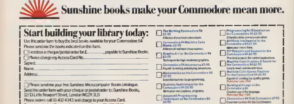
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All the above clues follow The Corner's formula — starting at the second letter of the clue, read every other letter until you reach the final letter. Then return to the very first letter, and repeat the process.

Next week I'll be looking at *Knight's Quest* again, with some hints and tips for the later parts of the Adventure — and I'll also be updating the HH0F.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Now your Commodore 64 is a robot or a synth. It's processing words, painting pictures & doing maths in machine code. It's teaching you, taking you on an adventure & using its brains ...All because you've read a book.



Peek & Poke



VIC PROGRAMS

R N Futcher of Anstey Crescent, Tiverton, Devon writes

Q **I own a Vic-20 and also have a 16K Ram Pack. Could you please tell me if I can use it for programs that need only a 3K Ram pack, or is there a program that can be typed in to make 3K programs work with a 16K Ram pack?**

A This is a typical letter from dozens I get on this subject. Indeed it has now replaced *Load/Save* problems on the ZX81 as the most common question. I have already looked at the quite ridiculous way the Vic's screen is mapped into the top half K of the first 8K memory block, thus effectively stopping the normal expansion of the Ram.

PCW did do an article on solving this problem but on looking back it was nearly two years ago in the days of the colour covers. Written by Malcolm Peltz it will be of benefit to many Vic owners to reproduce it again, so here it is:

```
10 IF PEEK (44)=36 OR PEEK (56)—32 THEN 200
20 A=PEEK (43)+256 ★ PEEK (44)
LO=A
30 IF PEEK (A)=0 AND PEEK (A+1)=0 THEN 50
40 A=PEEK (A)+256 ★ PEEK (A+1)   GOTO 30
50 HI=A+1   IF HI+4096 PEEK (55)+256★ PEEK (56) THEN PRINT "NOT ENOUGH ROOM TO MOVE THIS PROGRAM "   END
60 FOR A=HI+1 TO LO-1 STEP 1
70 POKE A+4609 PEEK(A)  NEXT A=LO
80 IF PEEK (A+4608) 0 AND PEEK (A+4609) =0 THEN 170
90 POKE A+4609 PEEK (A+4609) + 18
100 X = PEEK (A+4608) ' Y=PEEK (A+4609)
110 A = PEEK (A+4608) + 256 ★ (PEEK (A+4609)—18)   GOTO 80
120 X = X+2   IF X 255 THEN X=X 255   Y=Y+1
130 POKE 47 X   POKE 48 Y
140 POKE 49, X   POKE 50 Y
150 POKE 45 X   POKE 46 Y
160 POKE 43 1   POKE 44,36
170 RUN
200   Your Program
```

If you have 8K or more expansion on your Vic this will re-locate shorter programs beyond the User Defined Graphics area. Enter it as a routine before your own program which can then start at line 200. Line 10 is a check, and lines 20-40 work out the last address of your program, and is quite a useful little routine in itself.

WHITHER ORIC?

A Parker of Sandiway, Altrincham, Cheshire writes

Q **I wonder whether you could help me? I have an Oric 1, still under guarantee, and which is defective — a defect apparently present when I first got the machine. My problem is this: I cannot find an address to which I can return the computer. I have written to two addresses. Neither letter appears to have been answered. I believe there is a factory in Ascot but I have no details of this address. I would be grateful if you could help.**

A You have my sympathy, it must be very frustrating to have a computer that's faulty, and have nowhere to return it to. In all fairness to Oric I do not think this is deliberate. The address you are probably looking for is this one: Oric Products International, L T D, Cowarth Park, London Road, Ascot, Berks.

PRINTER PROBLEMS

C Scott, 23 Grange Road, Shilbottle, Alnwick, Northumberland writes

Q **I have recently upgraded from a Dragon 32 to a BBC B with disc drives and I am having problems with my printer, a Tandy CGP 115 four colour printer/plotter, which works well with the Dragon.**

Having bought the standard parallel (25 to 36 connections) printer lead from my local dealer which did not work, I checked all the contacts and all were properly made and there were no faults in the cable. I then reconnected the printer and plug as described in the BBC user manual, but still no action.

By now my trial and error ways are making my ribbon cable shorter by the minute, so I would be grateful if you would give me a pin by pin connection for my set-up.

A You do not say whether the lead you bought was the standard IDC lead for the BBC or not. If it wasn't then this is the source of your problem. However, if it was then the connection procedure is as follows.

You need to fit a Tandy connector to the non IDC end of your ribbon cable. The actual Tandy connector you need is described as 'DDK Amphenol 57/F 30360'. It is fitted by first removing the flexible metal strip, then attaching the 'red stripe' edge of the ribbon cable at pin 1 (ie as far left as it will go) and replacing the metal strip.

If this still fails to produce any results then I suggest that you contact Acorn (or the dealer who supplied you with the BBC) for advice, in that there could be a fault with the parallel interface within the BBC.

SPECTRUM TELETEXT ADAPTOR

S Gaargueb, 76 Bagots Oak, Stafford ST17 9SB writes

Q **Is there a teletext adaptor for the Spectrum computer? I was reading one of the early books for the Spectrum and the author mentioned something about it. Could you please confirm with some details.**

Also, I came across a nice little electronic typewriter, a Brother Personal Printer/Typewriter in the £100 price range. Could that be interfaced to the Spectrum?

A I presume that you wish to connect your Spectrum to Prestel or Micronet, in which case the Prism VTX5000 modem is what you want. All teletext conversion is carried out by the modem (which runs its own Rom based software).

I haven't come across the printer/typewriter you mention and can only say that:

a) if it has an RS232 capability and

b) you buy the Spectrum RS232 interface and

c) you can obtain the appropriate connecting cables

Then you would be OK, somehow I doubt it though!

WHAT DO POKES DO?

Neville Vassallo, Gemini Ct, Flat 2, EB Vella Street, B Kara, Malta (G C), writes

Q **While typing a program I came across these Pokes. Can you please tell me what they do? I own a 48K Spectrum.**

The Pokes are:

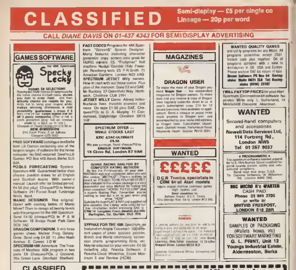
```
POKE 23561,0
POKE 23617 164
POKE 23609,50
```

A 23561 is the memory location referred to as Repdel (see chapter 25 of the Spectrum manual). By setting this location to zero, the program is producing an immediate repeat for any key pressed. In other words the *REPeat DELay* is reduced to nothing.

Setting 23617 to 164 changes the cursor presentation for input statements. It appears as a flashing black bar as you get if you flash a graphic 3.

23609 is used to control the length of the click you get when a key is pressed. Setting this location to 50 produces an audible note each time a key is pressed.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.



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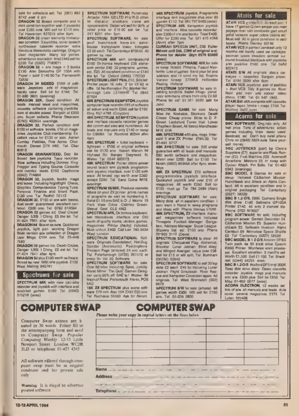
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VIC 20, C2N cassette unit Commodore 16K Ram pack, £100 of s/w books magazines leather cover, 1 year old one cartridge £128 ono Call Mark, Epsom 27682.

VIC 20 3K Super Expander Boxed. £10 50 Tel Chelmsford 57663 after 4pm

VIC 20 FOR SALE with cassette recorder and games Sell for £46 Tel 0604 402750 Ask for Mark.

VIC 20 and tape deck, joystick, cartridge cassettes books etc £170 or swap for 48K Spectrum Tel Coppull 792879

COMMODORE 64 cassette unit 7 books Extended Basic and games and joystick, £260 ono Tel 861 2525 (01)

VIC 20 CASSETTE DECK switchable 16K joystick ZX printer and interface Speech synthesizer £200 of s/w £350 ono Tel Theydon Bois 2846 after 5pm

VIC 20 C2N cassette unit Introduction to Basic and tapes £100 of s/w Mags and books leads £130 ono Tel. Leatherhead 378889

CBM 64 CMB 1541 disc drive juki blue printer and prints green monitor and s/w £750 the lot Tel 01 204 1157 (Stanmore)

VIC 20 + 32K + books + joystick + £90 of software & compatible cassette unit + mags worth over £200 00 sell for £140 00 ono Better offer than VIC starter pack Telephone Steve on Coventry 418808

COMMODORE 64 + cassette deck 10 months guarantee complete with £160 top games joy stick, Books Sony 9" B W T V £300 For quick sale Tel Chesterfield (0246) 822068

COMMODORE 64 garanteed 1 month old Never used + basic manuals Plus £50 worth of mags Bargain at £160 00 Tel 001-772 3838 Ask for Martha Piggott

COMMODRE 64 plus C2N cassette 1520 Printer 15 tapes books and stock 3 months old. Offers around £360 Buyer collects. Telephone after 3p m Any day Tel Fant 794906

VIC 20 plus 16K rpm pack C2N cassette drive 2 Joysticks O level Geography plus £100 worth soft ware Inc 6 cartridges and track £220 Phone Monmouth 23678

COMMODORE 64 Quickshot Joystick cassette Interface Falcon Patrol 2 month old Little used £180 Tel (Milton Keynes) 0908-311987

VIC 20 software for sale all originals Xeno II Jetpac Skramble Cosmic Firestfrel Cyclons Dungeons Wizard + princess, skyhawk £3 Each or the lot for £21!! Tel Formby 71812.

COMMODORE 64 plus C2N cassette unit quickshot joystick software including manic miner skramble revenge of the Mutant Camels Only two months old £260 ono Ring 01-204 2488 after 4pm.

VIC 20 tape, £40 s/w cartriges m/c monitor + £30 worth of books Swap for CBM 64 Ring any night 4 30 — 6 00 Call Pete on 0282 98458

VIC 20 with C2N cassette unit,m basic 1 32K switchable. joystick. 3 cartridges nele cassettes including Wacky waiters, Catcha Snatcha. Sell for £170 or swap 48K Spectrum with S/W Tel 929 3324

VIC 20 super expander 16K ram motherboard & joystick. Ten cartridges, over 20 cassettes. (all top machine bone arcade originals) & books magazines All vgc & guaranteed, cost £300+ Want £180 or £150 inc B/W TV 01-444 6132

VIC 20 16K £50 games 2 cartridges joystick books and intro to basic part 1 worth over £225 sell for £120 Phone Duhess 617966

VIC-20 space raiders, for uneap Only £3 00! and get blank C-15 tape with 2 games. Guaranteed or money back — C H S Ltd 86 Park Avenue Clough Hall Kidsgrove Stoke-on-Trent Staffs ST7 1B6

16K VIC20 tape player various manuals £60 of software including scramble Arcadia Wacky waiters, Dungeons worth £270 all offers. Considered or swap for CBM64 Tel Coventry 415348 after 6 30 p m

VIC-20 computer 16K Rampak C2N cassette und £50 of software Also introduction to basic part 1 Still under guarantee worth £290 sell £130 buyer collects Tel 0632 586184

UNEXP VIC20 cassette one Contains panther utility and HI-LO simulation an absolute bargain at only £2.50 Send money to John Galvin, 784 Liverpool Road Eccles, Manchester M30 7LN I'll pay postage

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COMMODORE 64 + disk drive for sale £400 ono Phone 736-3886 and ask for Byron

VIC 20 with recorder 16K RAM pack, joystick Introduction to basic part one and software worth £210 Sell for £170 Phone Larkhall 882835 after 5 o clock

VIC-20 + 16K + cassette + quickshot joystick + bags of software including big names worth over £1000 Good condition all together worth well over £1100 Offers Tel Rochdale 353710

CBM 64 + C2N cassette joystick, lots of books inc Programmes Reference Guide basic one 15 games inc Flexain patrol Rom game Ibadic £260 Tel. 485 3611 ex 6548 (evenings)

SELLING my complete collection of VIC 20 + CBM 64 s/w Phone for lists 77335 Derby

VIC 20 starter pack as new with 4 slot. Switchable mother board 16K super expander Zargon Chef and Lothir £140 The lot. Tel (0824) 48071

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VIC 20 + cassette + 16K R/P 2 catridges various games 8x4 + Mags £100 Tel 01-205 2834 (Catholic)

ORIGINAL SOFTWARE for VIC-20 + books. All half price Tel 01-303 8277 After 5pm

CBM64 + CBM cassette player 3 several parties image etc. 1 month old £230 01-580 7325 (anytime)

VIC 20 C2N cassette 3 joysticks + Intro to basic part I & 3 8 16K + Programmer Aid + A Cartridge + 110 Cassette games + 8 books. Offer Tel 01 205 9040 after 4pm

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CBM 64 games £3 00 Inc. revenge of the Mutant Camels Grid Trap everest and snooker Attack of the Mutant Camels Many titles Tel 01 844 3818 (eves)

For sale

VIC 20 software for sale Quackers Wacky Waiters Catcha Swatcha Panic, only £3 00 each all originals Tel Wormley (042876) 2220

VIC20, cassette unit, 16K Joystick over £120 software including cartridges 16K Defenda Skramble Lazer Zone Matrix Sat Pac also Asteroids Panic Frantic etc Cost £400 Sell £200 no offers Wraysbury 2616

COMMODORE 64 original software for sale or swap also BBC model B disc interface wanted D/D if possible Tel 051 420 3482

VIC20 and C2N cassette unit with 3 cartridges — Omega Race Rat Race and Sargon Chess Also 3 Cassettes — Panic Cosmiads Asteroids, £100 ono Tel Simon Langley Mill 712836 after 6pm

BBC SOFTWARE originals £5 00 each wanted colossal adventure lords of time (level 9) Dragon Quest, Bug Byte (0438) 60537 (eves)

BBC MICRO model B O S 1 2 Inc. and £350 ono Tel 0223 84454

ACORN FOR SALE — BBC 100K TEAL disc drive with disc doctors rom + over £600 Worth of s/w whole lot worth over £700 Sell for £25 (no offers) Tel 05827 69152.

ACORN ELECTRON for side sell boxed with intro tape books cover etc. £175 00 Oxted (08833) 5074

BBC 3 complete with manuals and Welcome Pack Never opened £350 Tel (04867) 6765.

BBC FOR SALE 1 2 o/s loads of s/w 6 months old £350.00 Tel Tony on Orpington 74904

TORCH 240 disc pack for BBC model B Hadley used Still boxed with Free perfect software £525 Tel 0344 886178

BBC MODEL B with disc interface Acorn speech upgrade Rom expansion board with wordwise also beep cale £390 Epsom FX80 Printer £300 Micro filtec colour monitor £180 00 Tel (0344) 886178

BBC MODEL B £50 of s/w £320 Tel Walgrave 2702.

HOBBIT TAPE drive for BBC Micro + zero memory option also 6 tapes worth £175.00 Accept £110 Tel (0388) 52891

180 + COMPUTER magazines £25 ono Also 30 2708 Eproms + 10 assorted peripherals/cpu s (all used but working) Andrew 0602 81876 after 5 pm.

VG/TRS80 software original melimarex adventureland, instant sort search texpro. full screen edit, race draw graphics resolver Computing Today Valley Tandy microchess £30 The Lot Tel Little Chalfont (02404) 4711

SHARP MZ80A plus 14 software cassettes manual and other relative books 11 months old in perfect order only £290 Tel Selkirk code (0750) 20214 evenings or weekends.

COMMODORE 64 "Telenard" adventure with book will swap for 2 or 3 English games or 1 utility prog (pref) "Progeal" write to 26 Birkside Way Mereside Blackpool FY4 4TZ game is original Martin Duffy

VIC 20 original games boxes and rampacks to be sold separately or in package for £115 ono Tel Prestonians 811 224 for details.

MAGAZINES FOR SALE rates weekly 1 monthly half price — stretching back years Tel 0259 80840 ono

EPSON MX80FT type 3 graphic chip installed C4ble includes for Atari micro Will sell for £185 Ring David after 11pm from Monday to Friday Tel 01 896 6654

WANTED! NON WORKING Spectrum 16 or 48K (for parts) will pay reasonable price Absolutely any condition! Send details and price to Richard Hasty, Hagel Strasse 120, 6520 Worms West Germany

SWAP COMMODORE 64 + C2N recorder + books and well known software for BBC B or Electron with extras Tel Uxbridge 56607 ask for Martyn after 7pm except Tuesdays

WANTED VIC 20 tape recorder and manual £50 offered 0602 811700 after 7pm (K.J Hesler)

SPECTRUM OWNER to swap cassettes flight SIM £500 Planet Death £400 Espinage Island £400 Trees Tower £4.50 O level chemistry, physics each £700 Several more great bargains Tel 034 226568 after 4pm

WANTED ANY SOFTWARE for Spectrum 16 48Ko computer plus PCW magazines from 2/2/83 to 1/12/83 please write to Mr Ouejid Younes 17 Rue Paup Cangarin 93430 Villetaneuse France

SWAP ZX81 software Vu-calc Pelon Flight Raiders, Bomber, COS Pheonix Adventure All 4 tapes for PSS Mcoder or Mcoder II Wolverhampton (0902) 725762 after 6pm Ask for James

MICROTAN 65 Tanex 10K basic Abug Tanbug V2 Tanram 40K, Memory Manuals and forth on tape with Home Brew case and power supplies with ASC11 keyboard £250 Tel 054283 3411 after 6pm

SWAP VIC20 pirates cove for the count or voodoo castle Bodmin 6088

SHARP MZ80K + basic extensions Basic assembly + forth language Also books, sharp users notes + mags £280 ono Tel Birmingham 021 356 1808

WANTED ADD on keyboard for Spectrum will swap for Cordless Tel very good range with paging etc. Tel 0472 802448

96K LYNX and joystick interface and joystick and RS232 printer interface and mags and much software All for a bargain price of £290 Worth at least £400 Ring Stafford (0785) 881745 after 5pm

LYNX 48K £96 ono Tel Exmouth (0395) 278482 after 6pm weekdays Anytime weekends

NEWBRAIN AD plus Sanyo Starter recorder Dr 101 Beginners guide Star Trek Investment Management, all boxed Hardly used Only £205 Tel 01-794 1668 after 6.30pm

LOTS OF S/W for Sharp MZ-80K. A price range from £3-£4 01-455 6641 after 4.15pm

HEWLETT PACKARD 80 Calculator with case transformer charging unit, 2 soft rechargeable batteries, manual £30 Texas TI 58 Lost Charger £15 Heywood 14 Darling Road SE4 1YQ. 01-692 8877

ZX PRINTER as new £26 ono. Tel 0259 80840 after 6pm

SHARP MZ-80K with twin disc drives 48K Yours for £240 or swap for Commodore 64 and tape deck Packages includes four dialects of Basic Forth and lots of s/w Phone Peter on Warrington (0925) 56661 after 6pm

LYNX 96 Manual books and leads. Boxed and under guarantee Also serial pack disassembler Snowball etc £170 Lynx joystick interface £10 parallel printer pack £35 Both boxed and unused Tel 0703 844051

SHARP MZ 721, 3 months old Basic, Pascal Forth language and 40 programs £235 ono Tel 0926 463632.

SHARP MZ-80K 48K plus Hi-res Xtal Basic Basic extensions Integer Basic Compiler Sharp and Hisoft Pascal Knights Fortran £250 ono Seikosha GP80 D Printer £100 ono Tel Medway 377756

MICRO PROFFESSOR. Z80 based micro with Z80 assembler Machine code Training Manual £45 Tel (0444) 456026 after 7pm or w/ends

TRS 80 Level 1 4K memory monitor screen tape programs and mags Tel for details 01-90K 8876.

SIEKOSHA GP250X Printer 80 cps with manual and lead for BBC B including 2000 sheets paper £175 ono Tel 04865 2452.

ZAXXON CARTRIDGE for sale for use with the Colecovision system. Tel Moro 824885 between 5pm and 7pm

SHARP MZ80A 48K monitor cassette deck built in or swap for Vic 20 starter pack plus games or sell for £200 ono Mr N Barber 136 Norwich Row Park Hill Flats, Sheffield S2 5RH

WANTED C2N cassette unit + joystick Tel 01 348 8271

WANTED 48K Spectrum with or without s/w £70 Tel (0900) 824202

SWAP DRAGON GAMES my titles inc King Cuthbert, Frogger Writer Empire, Kriegspield, Strategic Command and similar Tel (04628) 6521 after 4pm

I HAVE PRODUCED 10 'O' level physics educational programs for the 16K Spectrum and wish to sell them to a company Please write to 6 The Fir Trees, Thorpe Willoughby Selby N Yorkshire YO8 9PR

WANTED ORIC 1 48K with/without software or books. Will pay £65 to £80 Must be in excellent condition Tel Porthcawl (065 671) 4304 after 4pm

SPECTRUM DEVPAC 3 (original) wanted for swapping either Games Designer or any three of other originals including Ultimates SAW for other titles 54 Park House 314 Seven Sisters Road London N4 2LS

48K SPECTRUM lots of games AGF programable joystick interface and recorder Swap for CBM64 or Atari 600XL or 800 must have recorder Phone 01 237 2324 between 9-5pm Ask for Billy (weekdays)

SPECTRUM SOFTWARE to swap over 150 titles Please send your list to S.A. Robinson 18 Sumpter Croft Penwortham Preston, Lancs. PR1 9UJ + Micro Drive order form for sale Phone (0727) 744439.

GAMES DESIGNER for spectrum to swap for H V R G or sell for £12 brand new unwanted gift. Mr Keith Burton 6 Westbourne Terrace Barnsley, South Yorkshire Tel (0226) 292118 after 7pm

WANTED DRAGON RTTY or disc s/w to swap Although I will swap anything I have well over 80 titles. Ring Fleetwood 70044 ask for Russell after 4pm

DRAGON 32 software swap — ultimate adventure 4 Mansion Adventure 1 and escape all Microdeal for any 1 haven t got. Tel 09642 2950 I will pay postage

DRAGON OWNER seeks like for swap wees progams etc Contact Ian 3 Birchwood Ave Grove Hill M bro Cleveland TS4 2XB

SWAP ORACLE'S Cave for Black Crystal Manic Miner for Ghost Town Molar Maul for Horace and The Spiders and 3D ant attack for Xalem All originals please Tel Gordon 0382 502066

WANTED ANY NON-WORKING ZX printer for cash. Phone (0908) 72048 or write to Mark Purcell 8 Wordsworth Drive Bletchley Milton Keynes MK3 5HR

SWAP AUDIOLINE car AM FM stereo cassette player in very good condition for a computer printer the smaller the dealer Write to Rennie 87 Church Rd London NW4

SPECTRUM IN GOOD working order prefer 48K will consider 16K. Ring Swindon (0793) 47281 Answer phone service

SWAP CURRAH microspeech unit for Timedata sound box Also SWAP sinclair IQ Test & "Fifth" for machine code books or tutor — program Also two joysticks for sale. Tel Graham Wakefield 252046

WANTED ANY NINE pin joystick In part exchange with copying program For further details write to M York Old Vic Abbotsholme School Rocester Uttoxeter, Staffs ST4 5BS

AQUARIUS WANTED will swap for 16K ZX81 original programs including Monster Maze and one month guarantee (negotiable) Tel South Shields (0632) 553186 after five and ask for Ian Boyer collects.

ORIC 1 48K with joystick, games worth £80 (all genuine) Books Oric mags all for £180 MCP-40 colour printer plotter £120 or £275 the whole lot Buyer collects. Tel 01-480 9334 evenings

ORIC-1 48K with external reset button, eleven months old plus joystick and interface speech synthesizer three decks Forth £76 of software £155 Tel Haywood (07086) 6233186 after six

SHARP MZ80K, P3 printer, interlaced bee crystal basic forth, pascal assembler fontan chess and many other programs plus books. Offers Tel Langport 250130

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LYNX 48K in good condition £120 ono Tel 025 344330

NEWBRAN AD £150 Sharp TC 1251 and printer micro cassette unit £120 Tel 01 790 0666 (daytime)

ELECTRON 4 MONTHS old + 8 games all leads very good condition Reason to sell to purchase BBC £170 ono Tel Dunstable (0582) 68207

HUNCH BACK, B7 Ocean Forth Alchemist for sale each one goes to highest offer By Monday evening. Ring David after 4pm on Reading (0734) 861401

ACETRONICS MPU 2000 video game concol + Invaders Boxing Cartridge Needs new joysticks Cost £30 Quick sale wanted Tel Radcliffe 7431 (Colin)

SPECTRUM OWNERS! The ultimate toolkit. Includes Ram Tester Trace Assembler + many more! £4.50 (or s.a.e. for factsheet) 10 Whitebeam Drive Liverpool L12 OAU

UNEXPANDED VIC20 horsebet a family game for up to 5 players bet on 8 horses The race is in Hi res graphics Vic is banker Send £1 50 to D Spencer 230 Lowgrange Avenue Billingham Cleveland

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SPECTRUM SOFTWAPE library two weeks hire £1.00 life membership £5.00 stamp for lists to hire-soft 113 Broomfield Road Marsh Huddersfield.

3D DEFENDA ZX81 100% M/C Smooth Arcade Action tape £2.50 S.A.E lists James Paton, 2 The Avenue Fallings Park Wolverhampton

BBC PERSONAL BANKING attends to S.O and D.D automatically Send £3 95 Whiteheads Household Freepost 11 Crossle Road Northwich Cheshire

MICRODRIVE EXCHANGE. Have you been wasting your time transferring tapes to microdrive & they didn t work? New newsletter club solves the problem in most cases basic I included transferring VU FILE and programs which normally overwrite the microdrive map Membership is £8/ year ZX GUARANTEED 29 Chadderton Drive Unsworth, Bury Lancs

NEWBRAIN MODEL A plus compatible (Sanyo) tape recorder Beginner s guide and tape Two independent guides including m/c Gobbler game £150 + p&p Evenings Tel Bourne End 23734

NASCOM 48K RAM 64K Rom contains Basic, Pascal Pilot, Zpeo Nas-Dis Debug Nas Pen 6000 double micro-cassette drive All documentation £450 ono Tel Sellwood 0235-21900 ext 5367 (day)

DRAGON LIGHT-PEN. Read uses One week old Trojan light pen allows Hi-res or text screen input. Hi-res draw also £10 Tel. Batley (0924) 470377 after 5pm

Wanted

COMMODORE 64 wanted Tel Woking 70318

SWAP VIC PANIC Crabes Bewitcher 48 in good condition. £3 each or swap Tel Rob Harrowgate (0423) 886266 after 4pm.

HELP! I really need somebody. Help! My Vic 20 has got a super expander and compute's! First Book of Vic (quick) Tel 0994 822509

SWAP 8 Danger Ranger Talking Android Attack Scramble Donkey King Katterpilla Attack, Flipper Adventure, for a Dragon Speech Synthesis Module also Want a Rainbow Writer Jimmy 9 Granville Road, Lancaster, Lancs LA7 2PA.

SWAP SPECTRUM games and utilities Phone 01-998 3816 any time and ask for Peter

SPECTRUM SOFTWARE to swap or sell Games Designer Black Crystal Blind Alley Beyond Horizons High Noon, D.N.P.G. Spectrum computing tape magazine 1 to 4 Details Keith Burton, 8 Westbourne Terrace Barnsley Yorks

BBC SOFTWARE will swap Franklyns Tomb Gunsmoke Lost City Countdown to Doom Escape from Moonbase Alpha. Send list to S. Rayner 15 Welbeck Street, Abbey Hey Manchester M18 8GW

INTELLIVISION CARTRIDGES to swap Sea Battle and others. Also Spectrum software to swap Hong Inca Curse and more Phone Tim (0 Melton Mowbray 46617 after 5.30pm.

SWAP AQUARIUS SNAFU cartridge and cass of programs and £10 for Aquarius Data Recorder or sell for £15, 7 Mill Stile Braunton, N Devon Tel. 814010 after 5pm

16K ZX81 fuller keyboard and £35 of s/w Swap for 16K or 48K Spectrum. Tel. 0274 834450 eves.

KEYBOARD SPECTRUM. Will swap for cordless phone Very good range. Tel 0472 602445.

COMMODORE 64 owner wishes to contact other 64 owners to swap games and ideas. Contact 10 Rothbury House, Kings Lynn Drive Harold Hill Rainford, Essex

SWAP CBM 64 with Arrow cartridge and cassette and printer with interface and books, 3 months old. Swap for Mark I Osborne Tel 01-478 7868 after 6pm (John)

AQUARIUS WANTED Swap for 16K ZX81 and Inc Monster Mazze 3D Defidser Mazogs manual etc and 1 month guarantee (negotiable) Tel Sth Shields 0632) 563159

TI 99/4A and s/w modual Inc Multiplication Division, addition and subtraction early reading beginners grammer and TI logo and any necessary additions to enable logo programming will pay up to £100 ono Tel 01-843 1090 after 6pm

CENTRONICS HANDBOOK for 501 printer buyer borrow and RS 232 interface or Spectrum Tel (work) 0892 460355 ex 48 (home) 08892 480 695

BUSINESS PROGRAMS for disc based TRS 80 Mixed III Tel 0345 32693

WILL SWAP £40 of original software (Pimania, Espionage Island Mazeman Space Intruders, Meteor Storm and PSE games tape 2 for ZX Phoon (good condition) Phone Aldershot 25783 evenings after 5.30pm

SWAP SNOOKER TABLE, 6 x 3 plus 3 cues and balls for ZX Spectrum Must be in good condition issue 2 3 16/48K Tel Sth 0702 540452, buyer collects, ask for Paul.

ATARI 48K 48K with tape recorder and Basic cartridge and and and joystick for a ZX Spectrum 48K with recorder and and Tel Ash Green 074664 after 8pm.

ACORN ELECTRON, prefer London area Tel North Wales (037882) 2654

URGENT! SWAP OR SALE. Atari VCS with six cartridges including E.T., Dodge Em Street Racer Air-Sea-Bat, Combat, Grand Prix £70 or swap for any computer (not ZX81) Call or write to Ian, 49 Pitch Lane, Huyton, Liverpool L24 0LD

POOR BELGIAN ZX Spectrum owner wishes to swap or buy software at reasonable prices Please write to Luc Heirman, Harrier Van Beeksestraat, 169 2300 Turnhout (Belgium) (14) 424115

SWAP SPECTRUM Software Arcade games plus Adventure (Mr Whimpy Hunchback, Valhalla, Hobbit) etc For DK Tronics keyboard. Write W H. Gray 87H Towns Drive Midton Gourock, Inverclyde Phone(Gourock 39817 evening.

SPECTRUM SOFTWARE, Speak Easy Galaxy Attack, Jetpac Ground Attack, Night Flight, Games Designer Great Britain Ltd Excellent condition. For sale or swap. Tel. (0473) 822284 (evenings)

SPECTRUM. Swap Kempston joystick interface for Valhalla or Hobbit. Spectrum Briefcase for printer both in excellent condition Ardy Barlow 22 Maes Cymbryd Llandulas Clwyd LL22 8HF

SPECTRUM GAMES wanted or to swap for Kong Acid Attack, Manic Miner Shuckle Chuckie Egg Football Manager and Jetpac. Tel Rayleigh 770580 evenings

CEASER THE CAT adventures and other CBM 64 games to swap for any other adventures Preferably level 9 adventures Tel CBM 270820 evenings.

WANTED 3.5 JUPITER ACE around £40 Will collect if in Leicester area. Phone Welford (085881) 346 after 5pm.

SPECTRUM SOFTWARE to swap sell Arcadia Deldums, Zzoom and 30 others. Microdrive free to find reply Wanted Hobbit pinmania, M/Miner Valhalla Your list for mine! Contact R. Lucas Sergeants, Romans Road Winchester Hants

ZX PRINTER. Will pay up to £25. Tel 01-594 0894

SWAP ON SELL Spectrum and Inc Groucho Cookie, Avenger Harrier Attack, Dictator Johnny Rob Meester Storm Tyrant O Fathers, Scasoft, Chemistry Physics, Picturesque assembler Tel Lambleugh 481275 (Cumbria) after 4.30pm

MONEX RS232 Centronics Printer Interface for Spectrum Willing to accept £20 Tel 01-580 7262 room 422 (Andrew eves)

EPYX, TRONICS, any other other new Vic 20 s/w to swap Tel 025 971 3445 after 4.30pm

SWAP HEWLETT PACKARD Hp41C programmable Calculator as new For CBM 64 Spectrum 48 Oric with tape or disc if possible Tel day (0284) 811839 Chester area.

TRS-80 ADVENTURES for Mixed I level 2. Especially the system and Infodon adventures. Tel Basildon (0268) 555655.

ATARI 800 Disc drive Good condition. Tel Leicester 872940 after 6pm

LONELY DRAGON 32 wants Hi-Res cartridge. Will swap for 5 cassette games Telephone Corby (05363) 66590 after 6pm

CBM 64 GAMES. Swap or sell. 42 originals. Tel 0272 837817

SPECTRUM OWNER would like a penfriend to help in programming Exchange Ideas. Please write to Chris Rainet at 2 Mill Hill Road, Hinckley, Leicestershire LE10 0AX.

WANTED DRAGON 32 with leads and manual are only required Will pay around £80 Tel Coventry 696412.

WANTED 1K ZX81 In good condition no software, leads or peripherals please £15 or near offer Tel (0264) 4528 after 5pm.

48K SPECTRUM under £100 if possible with software can't collect out of Manchester area. Tel (061) 794 5644 after 4pm

SWAP YORK HOME BASE CB, power mic, aerial and S.W.R. meter (worth over £120) for a computer or equipment for BBC and Spectrum Tel. Vicki on Potters Bar (77) 53596

COMMODORE 64 software to swap. Phone 031 661 7477 after 6pm or weekends Ask for Mario

SPECTRUM S/WARE for swap Hundreds of titles to choose from Send your list for mine Immediate reply Eddie Earley 65 Anner Road, Dublin 8, Ireland

DRAGON SOFTWARE to swap Leggit (Imagine) for Transylvanian Tower (Richard Shepherd) Crazy Painter for Cuthbert in the Jungle and Space Shuttle for Keys of the Wizard (all frod Microdeal) Other offers welcome Phone Hereford 0432 273439

75 SPECTRUM MAGAZINES. Inc PCW Your Computer Sinclair Programs etc Will swap or sell Phone David. 01-654 8360 eves only

SWAP ZX80 Sinclair 16K Ram, for any computer except ZX81 or pocket computers. Tel 01-455 0641 after 4.15pm.

16K SPECTRUM Jet Pack swap for any version 16K Spectrum Donkey Kong. Tel 01 986 7556 (eves)

WANTED the following adventure games for ZX81 Planet of Death Inca Curse Ship of Doom Any Adventure games for BBC Model B. Tel 061 339 3227 after 6.30pm.

SPECTRUM 48K in good condition, preferably N/W area. Tel 061 481 1169 after 2pm

CBM 64 + C2N cassette unit boxed as new + s/w files + manual, swap BBC Model B and give £100 cash. Tel 01-886 4159

HARDWARE checking program required for Spectrum 16 + 1 or 48K Top price paid Send details to S. Dean 40 Paddington Walk Bentley Walsall W Mids.

SPECTRUM GAMES to swap Alchemist, Ant, Attack Mined Out, M Coder English Literature Pac-Man Berserk, Scramble Level Snaker Tel (0272) 568598 Also Atari Compatible Pistol Grip Crack Shot, Joystick £7 + P&P

SWAP SPECTRUM originals. ABC Lift-off Pathfinder Hot Dot Spotter and Alphabet for other educational 01-800 6767 After 7pm

EXTENSIVE RANGE of colour darkroom photographic equipment and supplies available to swap for Epson FX80 or colour TV monitor Might sell. Tel 01 878 1844 (eves)

WANTED, help with adventure A for 16K Spectrum 1 Can get as far as the Ford Field and the Maze Write or phone 33 Parkin Close Pokinfield, Cheshire 061339 4325

SWAP VIC 20 + C2N + 16K/8K/3K + 3K Super Expander £150 Software + Joystick, books still boxed with cash for ZX 48K Spectrum or sell for £140 ono

SWAP Wacky Waiters, Arcadia Bewitched Gunfight, Gridrunner Abductor Panic, Skramble Slapdab all originals. 2 for 1 Expand Or 1 for any others. For Vic 20 or 2 for an Expanded Adventure Alice Seagrove, 34 Allenche St, Colne Lancs B38 099

SWAP VIC 20 Mission Impossible for any Adventure (Not Pirate Cove) Exeter (0392) 217322.

SWAP SPECTRUM Scrabble for The Quill Also swap Atic Atac for Sabre Wulf Attack. Have other Spectrum software to swap as well. Tel Gordon 0382 502085 (anytime)

WANTED URGENTLY Vic-20 Rabbit's Paratrooper for Unex machine Will pay bonus £4 (original) Also wanted, any ANIROG-Kingsoft Games. Telephone Kidsgrove (07818) 2718 after 6.00pm

WANTED ANIROG-Kingsoft software. For VIC-20 machine Any memory, Unex or 16K Expanded. Must be original swap Telephone Kidsgrove (07818) 3718 after 5.00pm

WANTED 2N tape unit and Joystick 01 348 8271 (eves)

WILL SWAP Binatone TV game and adaptor for three adventure games for VIC 20. Will swap Mole Attack cartridge for the Wizard and the Princess tape with other games for VIC20

WANTED FOR TI99/4A Mini Memory Personal Financial Aids and Othello Modules Phone 01-472 3791

WANTED 48K Spectrum with leads and manual Will pay up to £75.00 Edinburgh area Tel (5) 661212

SWAP Space Shuttle Gridrunner Stellar Wars Motormania and Quizmaster for the CBM64 for other good quality original games Especially interested in Level 9 and Channel 8 Adventures. Ring Sajid 01-698 8444 after 6pm

A.G.F. INTERFACE ONE plus Atari-type Joystick for Spectrum. As new £15 ono Tel Llanelli 2132 (evenings or weekends)

SELL OR SWAP Sharp M1 700 with built-in data recorder Swap for printer or BBC Compatible disc drive or sell any reasonable offer Tel 0487 814043

SWAP 40 Channel CB + Aquarius Computer + games cool and 16K or 48K Tel 01 720 84843

BBC DISC owners to swap and I need many titles inc JCB Ideal Acorn Soft Superior programing etc. Tel 66827 69152.

WANTED ZX80 computer working order Tel 0296 6800 After 6pm.

ADVENTURE HELPLINE

Micro *Vic 20*
Adventure *Pirate Cove*
Problem *At 68 years of age I enjoyed computing with my grand son. Then I was given "Pirate Cove" I can't get out of the flat*
Name *Bill Hanna*
Address *1 Shandon Crescent, Edinburgh EH11 1QE*

Micro *BBC B*
Adventure *Snowball*
Problem *1) What do I do at the revival machine 2) How do I open the doors that are too smooth to grip 3) Where do I find the space suit?*
Name *Craig Stevenson*
Address *64 Springfield Park Road, Burnside, Glasgow, Scotland.*

Micro *BBC B*
Adventure *Sphinx Adventure*
Problem *I have crossed the Glacier I can pass the Dragon Goblins and even (without the mouse) the elephant What next? Where is the boat?*
Name *John Reid*
Address *25 Coombe Hill Crescent Thame Oxon OX9 2EQ*

New Releases

METEORS

Gargoyle Games is another new Spectrum software house — a financial risk as certain as Monte Carlo. Nevertheless its first release is technically superb and pretty addictive.

Ad Astra is a shoot-em-up game but with large colourful graphics and a degree of three dimensionality raising the usual adrenalin level considerably.

Between each wave of aliens which hurtle from the far distance till within spitting distance to lob bombs at you, are some beautifully animated, tumbling meteors. The game caters for most joystick interfaces including Interface I.

My only (small) criticism is that the stars are static. Some movement would probably have been more exciting — but it's a great game anyway.

Program	*Ad Astra*
Price	*£5.95*
Micro	*Spectrum*
Supplier	*Gargoyle Games, 4 North Western Arcade, Birmingham B2 5LH*

TACTICAL

Computer War — the program based on last year's hit movie *War Games* is now available on the Vic 20 with 8K expansion.

Most spin offs are dreadful. This one isn't, being a nice balance between quick reactions and tactics as you try to save the world from global thermonuclear war.

Using a large scale map you must decide which missile poses the most immediate threat, track it down and knock it out. Time ticks away. Missiles can be deactivated at the last minute by matching two complex patterns using the joystick — succeed and one of your bases is saved.

However every success brings greater numbers of missiles and at some point destruction becomes inevitable. A morbid thought.

Program	*Computer War*
Price	*£5.95*
Micro	*Vic 20 (+8K)*
Supplier	*Thorn EMI Computer Software, Film House, 142 Wardour Street, London W1V 3AU*

SOUPED-UP

Cranky is part of Dragon Data's souped up new range of software. It is a machine code educational game — a rare enough thing in itself.

The program aims to help children learn number patterns and relationships. *Cranky* — the star of the game — is a pocket calculator whose circuits get damaged everytime it rains (a serious design fault I'd have thought).

Rather than send Cranky back under guarantee (perhaps being offered some rolls of printer paper for all the trouble he has caused) the children are invited to repair him.

Repairing Cranky involves the manipulation of numbers 3 and 5 to get a whole load of other numbers eg 3 + 3 = 6 — 5 to get 1 and so on. When all the required numbers have been found Cranky will work again. It sounds like one of the better attemps so far to do something sensible using a computer to educate.

Program	*Cranky*
Price	*£10.95*
Micro	*Dragon 32*
Supplier	*Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glamorgan*

Pick of the week

DRESSED CRAB

Although continuing with its plans for double sided cassettes containing two games, K Tel has opted for a more conventional one game format with its latest Commodore 64 releases.

Odyssey is an arcade game worthy of Jeff Minter in terms of pure speed of action. Over several screens you have to blast away at an army of robo-crabs in a variety of differing scenarios. In the first, lines of what look like tiny Pac men march across the screen up and down, left and right — a couple of hundred at least — you have to shoot them all.

I floundered at the next screen where a sort of white rugby ball is being guarded by several crabs — you have to hit it five times. The problem is it keeps sending out a missile which sends your score back to zero and is almost impossible to avoid. I didn't get beyond two.

The last screens are a crab-orientated version of *Scramble* where you have to pilot your ship over mountains whilst avoiding all kinds of attack — arcade geniuses may make it to the end, where lies the alien base itself. Addictive, with superb sound effects. Cheap too at £6.95.

Program	*Odyssey*
Price	*£6.95*
Micro	*Commodore 64*
Supplier	*K Tel, K-Tel House, 620 Western Ave, London W3 0TD*

NEW WAVE

Advancing with the Electron is the first Second-wave book I've seen for the machine.

Let me explain. Publishers want to make money. When any new machine is released there will be countless numbers of people who (a) can't find any software for it and want to type in the sort of games found in *100 games for* type books and (b) people who find the manual incomprehensible and need a book like *Ludicrously Easy Programming on the*.

After these people have got their programs and have made some sort of attempt at learning how to program then they want to go on to more sophisticated things like machine-code and advanced Basic — thus comes Wave Two.

Advancing with the Electron uses the development of a database program to illustrate things like elegant programming and debugging techniques. The database looks fairly substantial and the book seems above average in usefulness of content.

Book	*Advancing with the Electron*
Price	*£5.95*
Micro	*Electron*
Supplier	*Micro Press, Castle House, 27 London Road, Tunbridge Wells, Kent TN1 1BX*

SWEEPING

The latest Commodore program in Phoenix's range of twin Adventure/Arcade packages is *The Sorcerer's Apprentice*.

The arcade game follows the plot of the Walt Disney cartoon fairly closely, with you as a young magical apprentice left

alone with some recalcitrant brooms (perhaps what they need is a short sharp stick?) intent on leaving water all over the place

Using your magic wand you have to persuade the brooms to clear up the mess and visit the sorcerer s castle where you will be able to experiment with a whole series of spells, the function of which Phoenix is un keen to divulge You ll have to play it to find out

Success in the arcade game gives clues and the running code for the adventure This proved too tough for me to get very far even knowing the start code The only thing I can say for sure is that it's tough

Program	*The Sorcerer s Apprentice*
Price	*£9 95*
Micro	*Commodore 64*
Supplier	*Phoenix Software Spangles House, 116 Marsh Road Pinner Middlesex*

FACE PACK

I've had a couple of phone calls recently about the lack of educational software for the Commodore 64 — finally it seems to be trickling through

Identikit may or may not be very educational but I think kids will enjoy it As you might assume from the title, your task is to construct a face by choosing from a selection of different bits — eyes ears, nose mouth, etc It is rather like Commodore s own *Facemaker*

Most of the faces look like nothing on earth — one or two look like middle of the road pop stars As a sort of bonus the features can be made to move, ears wiggling, mouths smiling and so on

It's the sort of program that is ideal for the Commodore with its excellent graphics But I'm really not at all sure about its educational value — perhaps if your children want to become Policemen?

Program	*Identikit*
Price	*£7 95*
Micro	*Commodore 64*
Supplier	*Stell Software 36 Limefield Ave Whalley Lancs BB6 9RJ*

WARFIELD

Lest its ventures into arcade game publishing confuse us, Lothlorien has released some more strategy games, *Johnny Reb* on the Dragon and *Confrontation* on the BBC B

Confrontation is a game of tactics for two players using 20th century warfare including air combat and paratroops Victory can be whatever you want it to be and, likewise, you can create your own battlefields However, the game is supplied with a ready-made scenario set in Europe

All instructions in the game take the form of single key presses with graphic symbols depicting the various kinds of terrain including mountains marshes, towns, cities woods, and an airfield

I suspect that part of the fun of wargaming is to develop your own rules Nevertheless fairly extensive ones are supplied with the cassette

Program	*Confrontation*
Price	*£7 95*
Micro	*BBC B*
Supplier	*Lothlorien 56a Park Lane Poynton Cheshire SK12 1AE*

TUNEFUL

Spooky Mansion is a 100% machine-code arcade spectacular — at least that is what the blurb says In any event it sounds like fun of the (broadly) Manic Miner variety

The appallingly named Hugho First must move through seven levels in a mansion collecting objects as he goes

Guess what There are obstacles in the form of various creepies and ghouls which have been sent by Count Dracula to bar your way

Where the game definitely does score over similar games on the Spectrum is in the wide variety of tunes and effects it generates whilst you are playing

Program	*Spooky Mansion*
Price	*£7 95*
Micro	*Oric/Atmos*
Supplier	*Mercury Microware 1 Duxford Walk Moston Manchester 10 M10 9JN*

KILLER APES

Jungle Jive is a new release from Virgin running on both the BBC and Electron It probably won't appeal to campaigners for animal rights

The keyboard controls a lone explorer strolling through the jungle when suddenly (surprise, surprise) the enterprising adventurer is beset by dozens of strange animals including pink elephants and green crocodiles

The idea is to blast away at them with your rifle or run away, a mixture of both being necessary to do well at the game It is pretty basic but some form of subtlety is introduced in the form of baboons These are as dangerous to your health as all the other animals but killing them will result in your own demise Poetic justice I suppose

Program	*Jungle Jive*
Price	*£7 95*
Micro	*BBC/Electron*
Supplier	*Virgin Games 61/63 Portobello Road London W11 3DD*

STAR STRUCK

For Astronomers with a Spectrum *Planetarium* must be an essential purchase Using machine code it displays the sky at night with all the visible stars for any date, time and place between the years 1800 and 2100

Along with the impressive main display, a side display shows the altitude and azimuth of any visible planets Another command allows you to see selected constellations All the screen displays can be printed out on the ZX printer

Program	*Planetarium*
Price	*£7 45*
Micro	*Spectrum 48K*
Supplier	*Eclipse Software 79 Ardrossan Gardens Worcester Park Surrey*

BLOOD'N'GUTS

Orc Attack is a game for the Spectrum from Thorn EMI continuing the development of its Spectrum range

The basic game has been around for a long while and

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New Releases

◀ continued from page 67

probably gives ammunition to the Mary Whitehouses of this world The object of the exercise is to defend your battlements from hordes of Orcs who are attempting to scale them with ladders Other Orcs are firing arrows at your lone knight

The violence of the game comes when an Orc is successfully dispatched either by being cut to ribbons or crushed by a rock Each Orc explodes with blood and gore like something from a Sam Peckinpah movie — worst still is the boiling oil which dispatches the entire horde in a blaze of fire and mayhem

Violence aside it's a good game and infuriatingly addictive — technically it's pretty clever too, the way the Orcs mill about being particularly impressive

Program *Orc Attack*
Price *£6 95*
Micro *Spectrum 48K*
Supplier *Thorn EMI Computer Software Creative Sparks Thomson House 296 Farnborough Road Farnborough Hants*

FAIR FIGHT

Carnival Massacre is the latest Atari cartridge from Thorn EMI, and pretty gruesome stuff it is too 'Where fun turns to fear' it says enthusiastically on the front of the box

You are Super Sam defending the funfair from Butcher Bill and Ruthless Rick These alliterating agents of the awful aim to alienate all by potting passing passengers by pelting them with projectiles (enough! Ed)

People taking rides on the carnival ferris-wheel and roller-coaster are being thrown off by the two baddies You have to catch them whilst avoiding a bouncing spring The graphics are good and the music is in a suitable carnival spirit

Program *Carnival Massacre*
Price *£9 95*
Micro *Atari*
Supplier *Thorn EMI Computer Software Film House 142 Wardour Street London W1V 3AU*

DODGE ALL

DK Tronics seem to have been quiet for a long time now — its latest release follows a gap of several months

Given that it has been released all on its tod, it's a strange one

Trom is a game for the 16K Spectrum written almost entirely in Basic with a small amount of code for the graphics and movement In this time of flicker-free sprites and 3D logic, the game looks graphically clumsy

On the other hand it's pretty good fun to play — basically of the Dodge Everything variety It's so difficult you find yourself playing it time after time Strange

Program *Trom*
Price *£5 95*
Micro *Spectrum*
Supplier *DK Tronics Unit 6 Shire Hill Industrial Estate Saffron Walden Essex CB11 3AQ*

TEST CASE

It was with some trepidation that I looked at Pulsonics new releases

The company is selling its games at £2 95 each; 'a pocket money price' I suspected the worst — cheap prices to get rid of dreadful tat no-one ought to touch with a barge pole

I was wrong All the games seem to be worth playing and many are written in machine code Nothing staggering, of course, but certainly worth consideration

Ashes is a cricket simulation involving both tactics and quick reactions Graphically it isn't far beyond a ZX81 program but in terms of the thought required to play it's a very satisfying game indeed Factors like the type of ground, bowler and weather are vital considerations

Program *Ashes*
Price *£2 95*
Micro *Spectrum*
Supplier *Warwick Distribution 3 Standard Road Park Royal London NW10 6EX*

ALIEN FROGS

Hudson software the Japanese software company whose programs have formed the bulk of Sinclair's most recent software release have come to a similar arrangement with Kuma computers who have recently entered the Spectrum software market

Frog Shooter is one of the first releases Hudson's trademark seems to be large, colourful graphics *Frog Shooter*, far from being a Frogger derivative, is a bang-bang space fighter game

Your wing fighter zooms down a channel in which are found various aliens (marvellous sprite animation) Shooting at them seems to produce an alien evolution from funny disc to odd tadpole to bizarre frog The later the point of evolution you hit the higher the points Naturally the baddies fire back Unoriginal maybe, but graphically spectacular

Program *Frog Shooter*
Price *£6 95*
Micro *Spectrum*
Supplier *Kuma Computers 12 Horseshoe Park Pangbourne RG8 7JW*

BUSINESS

When it was launched, the Commodore 64 was being promoted as a business machine Although the excellence of some of the games has tended to obscure this fact, there is no reason why it should not be suitable for such purposes

One of the prime languages for business uses is *Pascal* — one that is rarely implemented on home micros However Oxford Computer Systems have now produced it on the 64

The version is a full implementation of *Ansi Pascal* generating standard p-code — the compiler is also written in *Pascal* Additions have been made to accommodate *Peek* and *Poke* and sprite editing

The disc-based version incorporates a disc to disc compiler using the entire memory for Pascal programs An extensive manual is also supplied

Program *Pascal*
Price *£14 95/£49 95 (disc)*
Micro *Commodore 64*
Supplier *Oxford Computer Systems Hensington Road Woodstock Oxford*

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, Popular Computing Weekly 12-13 Little Newport Street, WC2R 3LD



Top 10

Commodore 64
1 (3) Kazy Kong (Interceptor)
2 (6) Boogaboo (The Flea) (Quicksilva)
3 ( ) Revenge of the mutant camels (Llamasoft)
4 ( ) Superbillie (Commodore)
5 (2) Manic Miner (Software Projects)
6 (10) Chinese Juggler (Ocean)
7 ( ) Depth Charge (Commodore)
8 ( ) Mr Wimpy (Ocean)
9 ( ) Tank Maths (Superior)
10 ( ) The House (Melbourne House)

Vic 20
1 ( ) Snooker (Visions)
2 (2) Krazy Kong (Interceptor)
3 (3) Wizard and the Princess (Melbourne House)
4 (1) Flight 015 (Ferranti Davenport)
5 (5) Jet Pac (Ultimate)
6 (9) Grid Runner (Llamasoft)
7 (8) Arcadia (Imagine)
8 (7) Snowman and Maths Maze (Commodore)
9 ( ) Race (Commodore)
10 ( ) Super Vaders/Bomber Run (K tel)

Dragon
1 (1) Chuckie Egg (A&F)
2 (7) Up Periscope! (Beyond)
3 (8) Pedro (Imagine)
4 (6) Hungry Horace (Melbourne House)
5 ( ) Devil Assault (Microdeal)
6 ( ) Ring of Darkness (Wintersoft)
7 (10) Frogger (Microdeal)
8 (3) Kriegspiel (Beyond)
9 ( ) Dragon Dream (Oasis)
10 ( ) Scramble (Microdeal)

ZX81 *
1 ( ) Mothership (Software Farm)
2 (3) Krazy Kong (PSS)
3 ( ) Fantasy Games (Psion)
4 ( ) Flight Simulation (Psion)
5 ( ) Space Raiders (Psion)
6 (2) Asteroids (Quicksilva)
7 (1) Scramble (Quicksilva)
8 ( ) 1K Chess (Artic)
9 (4) Football Manager (Addictive Games)
10 ( ) Defender (Quicksilva)
* All 16K
(Figures compiled by Boots/Websters)

Atari
1 (1) Rally Speedway (Adventure International)*
2 (4) Warlock (Calisto)‡
3 (3) Caverns of Kafka (Cosmi)
4 (2) Slinky (Cosmi)
5 (8) Saga 8 The Count (Adventure International)
6 ( ) Preppie (Adventure International)
7 ( ) Meltdown (Cosmi)
8 ( ) Xenon Raid (English Software)‡
9 ( ) Planet Fall (Infocom)†
10 (5) Savage Pond (Starcade)

* Cartridge † 32K disc 32K cassette
(All figures compiled by Castle Computers, Birmingham 021 632 6458)

BBC •
1 ( ) JCB Digger (Acornsoft)
2 ( ) Fortress (Pace)
3 ( ) Chuckie Egg (A&F)
4 (9) Hopper (Acornsoft)
5 ( ) Chemical simulations (Acornsoft)
6 ( ) Cosmic Kidnap (Superior)
7 ( ) Super Invaders (Acornsoft)
8 ( ) Battle Tanks (Superior)
9 ( ) Chemical Analysis (Acornsoft)
10 ( ) Dodgy Dealer (OC consultants)
• All Model B
(Figures compiled by Micro Management)

Spectrum
1 (5) Jet Set Willy (Software Projects)
2 (4) Chequered Flag (Psion)
3 (6) Scuba Dive (Durrell)
4 (1) Atic Atac (Ultimate)
5 (—) Hunchback (Ocean)
6 (10) Flight Simulation (Psion)
7 (3) Lunar Jetman (Ultimate)
8 (7) Mr Wimpy (Ocean)
9 (—) Snowman (Quicksilva)
10 (—) Speed Duel (DK'Tronics)
(Figures compiled by WH Smith and Son, London)

Books
1 (2) BBC Micro Disc Companion *Latham* (Prentice-Hall)
2 ( ) Disc Systems for the BBC Micro *Sinclair* (Granada)
3 (5) Advanced Graphics with the BBC Microcomputer *Angell and Jones* (Macmillan)
4 (3) Advanced Programming Techniques on the Commodore 64 *Lawrence* (Sunshine)
5 (1) Interfacing Projects for the BBC Micro *Smith* (Addison Wesley)
6 ( ) 6502 Assembly Language Programming, *Kane and Leventhal* (Osborne)
7 (7) Computing for all the family on the BBC Micro *Hobel* (Sigma)
8 ( ) Spectrum Hardware Manual *Dickens* (Melbourne House)
9 ( ) Mastering the Commodore 64 *Jones and Carpenter* (Horwood)
10 (8) Mastering Machine Code on your ZX Spectrum, *Hobbs* (Interface)

(Figures compiled by Watford Technical Books, Watford 0923 23624 Prestel 263444)
(Last week's position in brackets)

Book Ends

HOBBIT GUIDE

You can now read the book of the adventure game or more precisely the book about the adventure game with *A Guide to Playing the Hobbit*

The book offers various levels of help from a general playing guide, to specific instructions on what to do at each location, and what objects can be found there A more strong-minded person than myself might manage to read only the more general advice and so leave the challenges open — but I confess I cheated

Although the book is short all the screens from the game are shown and both successful adventurers who have solved the program and those still trying to find their way out of the Goblin's Dungeon should get something from it

Book	*The Guide to Playing The Hobbit*
Price	*£3 95*
Micro	*BBC/Spectrum/ Oric/Commodore*
Supplier	*Melbourne House Castle Yard House Castle Yard Richmond TW10 6TF*

BARGAIN

It is certainly true that a lot of people find all those books called Introduction to Basic an introduction only to feeling even more confused than when they started There is always scope for making things simpler still

Very Basic Basic does just that The book is intended for the Electron but likely to be made available for other machines It covers everything from connecting the TV, choosing the right tape recorder to *Strings* and other Basic programming commands All Basic words are illustrated with an example I really think this is a book anyone could understand no matter how computer illiterate

The book won't take you very far into programming but the small distance it does go is thoroughly and clearly covered Not only that but it only costs £2 95 A bargain

Book	*Very Basic Basic*
Price	*£2 95*
Micro	*Electron*
Supplier	*Century Publishing 12 13 Greek Street London W1V 5LE*

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
5 A Side Football	S	BBC B	£7 80	Salamander
Crazy Tracer	Arc	BBC B	£9.95	Acornsoft
Digger	Arc	BBC B	£6.95	Visions
Eagle	Arc	BBC B	£7 95	Salamander
Learn About Shapes	Ed	BBC B	£9 80	Goldstar
Learn About Words	Ed	BBC B	£9 95	Goldstar
Sketch Pad	Ut	BBC B	£9 95	Goldstar
The Greedy Dwarf	Ad	BBC B	£9 95	Goldstar
Krypton	Arc	Commodore 64	£8 80	Ace
Indian Attack	Arc	Commodore 64	£9 95	Anirog
3D Speed Duel	Arc	Commodore 64	£6.95	DK Tronics
Colossus Chess	S	Commodore 64	£9 95	CDS
Cyberon	Arc	Commodore 64	£7 95	Anirog
Dark Star	Arc	Commodore 64	£8 80	Ace
Jungle Drums	Arc	Commodore 64	£7 95	Anirog
Lawde	S	Commodore 64	£5 95	Twilight
Magic Carpet	Arc	Commodore 64	£8 80	Ace
Mind Control	Arc	Commodore 64	£8 80	Ace
Moby Dick	Arc	Commodore 64	£7 95	PSS
Manroe Manor	Ad	Commodore 64	£8 50	Severn
Nitender	Arc	Commodore 64	£6.90	Ace
Pigs In Space	Arc	Commodore 64	£6 90	Ace
The Pyramid	Ad	Commodore 64	£8.80	Fantasy
Zodiac	Arc	Commodore 64	£7.95	Anirog
Moneybox	Ut	Dragon	£8 95	Harris
Chemistry Tutor	Ed	Dragon 32	£5 95	Multisoft
Extended Commands	Ut	Dragon 32	£9 95	Multisoft
Physics Tutor	Ed	Dragon 32	£5 95	Multisoft
Red Meanies	Arc	Dragon 32	£7.95	Salamander
Touch N Go	Ed	Dragon 32	£8.95	Goldstar
100 Programs for the Electron	Ut	Electron	£11.95	Prentice-Hall
Battle Flight	S	Oric	£4 95	Stour
Grid Bomb	Arc	Oric	£5.95	Touchstone
Racing	S	Oric	£8.95	Salamander
The City of ElhDollah	Ad	Spectrum	£8.95	Goldstar
Calorie Controller	Ut	Spectrum	£8.95	S D Micro Systems
Chinese Juggler	Arc	Spectrum	£5.95	Ocean
Coldfix	Ad	Spectrum	£6.95	Phipps Associates
Draw 15	Ut	Spectrum	£3.95	Fowler
Dyslexia Beater	Ed	Spectrum	£12 95	Mann Dinitz
Engine Collectors	Ut	Spectrum	£3 45	Placet
Grid Patrol	Arc	Spectrum	£5.95	Lothlorien
Manic Designer	Ut	Spectrum	£9 80	P & M Software
Matrix	Arc	Spectrum	£6.95	Salamander
Megagalactic	Arc	Spectrum	£8 95	Salamander
Millionaire	S	Spectrum	£5.50	Incentive
Mummy Mummy	Arc	Spectrum	£5 95	Lothlorien
Night Gunner	Arc	Spectrum	£6 95	Digital Integration
Titania	Ad	Spectrum	£7 95	R&R Software
ZigZag	Arc	Spectrum	£6 95	DK Tronics
Course Winner	Ut	Spectrum/BBC	£12.90	Selec
Kwazy Kwasas	Arc	Vic 20	£6 99	Mr Chip
Westminster	S	Vic 20	£6 95	Mr Chip
Climbird	Arc	ZX81	£3 95	Unicorn

Key Ad — adventure/Arc — arcade/Ed — education/ S — strategy simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week Popular Computing Weekly 12 13 Little Newport Street London WC2R 3LD

Ziggurat

Worthy of note

It's a fair assumption that readers of this magazine think microcomputers are well *important*. Your relationship with the wretched things may be a love-hate one — the balance tipping towards love when that vital tax fiddling program works first time, to hate when after entering 1500 lines of Basic you accidentally hit the *Reset* button conveniently situated next to *Return*.

But, of course the machines are important! Everybody says so. Newspapers drivel on about them all the time. Microcomputers are the sole growth industry of the eighties. Even W H Smith, usually so reluctant to handle offbeat commodities like books, now have vast computer book and computer magazine shelves dwarfing every other section of their shops.

Once in a while, though, you get to see it all from a chilly outside perspective, and this world of computer magazines shrinks like Earth observed from 250 000 miles out in space. It happened to me the other day. I'll try to lead up to it gradually and minimize readers' heart attacks.

First, a party game: write down the names of all the computer magazines you can think of in 60 seconds. Let's see: there are some weeklies like *Popular Computing Weekly*, *Personal Computer News* and *Home Computing Weekly*. A lot more monthlies: *What Micro?* and *Which Micro?* (I always confuse those two), *Personal Computer World*, *Computer Answers*, *Computer & Video Games*, a million others I forget. Upmarket ones, shading into mainframe-only interest: *Computer Weekly*, *Software*, *Computer Talk*, *Datalink*, *Informatics*. A ridiculous number are dedicated to one manufacturer or one machine: *Commodore User*, *Sinclair User*, *ZX Computing*, *Acorn User*, *Dragon User*, *A & B*, *Your Spectrum*, *Sinclair Projects*, and I've already seen *two* magazine supplements called *QL User* (hope they settle out of court).

Now brace yourself and let me break it to you. None of these magazines officially exists, not one. Their editors and readers, as appropriate in this year, are un-persons inhabiting a shadowy hinterworld. This startling news comes on high authority, nothing less than the *Writers and Artists Yearbook 1984* (A & C Black £4.50), 77th edition of "the indispensable handbook for writers." Among authors and journalists, the *Yearbook* is regarded as rather more authoritative than the Bible or even the *Oxford English Dictionary*.

According to the 1984 edition though, the *only* British newspapers/magazines concerned with computers are *Computing*, *Computing Today*, *Practical Computing* and *Your Computer* (the four editors concerned can now stop grinding their teeth to powder over their omission so hard, and instead can preen themselves smugly).

Now admittedly the *Yearbook* does explain that "Many journals do not appear in our lists because the market they offer for the freelance writer is either too small or too specialized or both." But to get this in its proper perspective you need to know that although they list only four markets for computer material, there are eight in the category of stamp collecting, and 27 under "Health, Medicine and Nursing." You know, all those health, medicine and nursing magazines that crowd the feeble minority of computer publications off the stands. Then there are 34 publications for the blind, mysteriously including *Piano Tuners Quarterly*, and you begin to wonder if the *Yearbook* editors would recognize a too-small or too-specialist market if it bit them in the leg.

Possibly Kingsley Amis, John Fowles and Salman Rushdie would not be bombarding all the computer magazines with articles even if the *Yearbook* gave more than four magazine names and addresses. But doesn't it seem silly for such a thriving and, dare I say it, important interest to be treated like this? Computer mag editors, worried about the standard of their submissions, could do worse than ask to be mentioned in the 1985 edition. If the *Yearbook* can mention *Ad Astra*, an SF magazine which ceased publication in 1981, why can't they mention *this* far more wonderful journal?

Meanwhile, when overwhelmed by the hugeness and bustle of the gaudy computer scene, the rest of us can take comfort from the thought of being a tiny minority interest, dwarfed by the titans of numismatics, scale modelling and stamp collecting.

David Langford

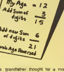
Puzzle

How old is Grandpa?

Puzzle No 102

Two people meet. The one says: "I have a brother" and the other says: "It's a small world, so have I."

Young Chris became a victim of just such an amazing coincidence. "This is odd," he remarked to his grandfather one day. "If I take my age in years and add the sum of its digits, then take this total and add the sum of the digits in the total, I get my age again with the figures reversed."



Chris' grandfather thought for a moment. "That's a coincidence — I can do exactly the same with my age!"

How old is Grandpa?

Solution to Puzzle No 97

The program works by summing consecutive odd numbers up to the sample address, *A*. A separate count, *C*, then continues until it exceeds *A*. If the count falls exactly on the value *A* the program ends.

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10 LET T = 0 20 FOR N = 1 TO 60 STEP 2 30 LET T = T + N 40 NEXT N 50 LET A = 101 60 LET C = A + 2 70 LET D = C + 2 80 IF C = T THEN GOTO 160 90 IF C > T THEN GOTO 130 100 LET C = C + D 110 LET D = D + 2 120 GOTO 80 130 LET T = T + A 140 LET A = A + 2 150 GOTO 60 160 PRINT A, D-2
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Find your way home by running the program. My address is at number 239. The last house on my side is number 337.

Winner of Puzzle No 97

The winner is: Ms R Yaakub, Isambard Close, Cowley, Middlesex, who receives £10.

The Hackers

Wow! 'Micro World' has another amazing free cassette offer again this month!

I can hardly wait to see what this month's amazing free software is!

It's patches for the bugs in last month's amazing free program...



...but seriously AUTOMATA
PIMANIA – the cult adventure that's for real! 16K ZX81 £5 BBC 32K £10 Dragon 32 £10 Spectrum 48K £10
GROUCHO – the Pimania sequel. Concord-QE2 USA prize. Free rock music on the flipside Spectrum 48K £10
PI EYED – the comedy cartoon arcade game, starring the PiMan. Free protest disco record. Spectrum 48K £6
PI BALLED – A triumph of the arcade programmer's art. Starring the PiMan. Free offensive Reggae music. Spectrum 48K £6
MORRIS MEETS THE BIKERS – exciting arcade fun, as seen on TV. Outrageous free doo-wop record. Any Spectrum £6
YAKZEE – Groddy wonderful game of rock and skier. An oriental masterpiece for Dragon 32 plus Spectrum 48K £6
GO TO JAIL – Play the game, find out what all the fuss is about, rookie. Spectrum 48K £6
OLYMPIMANIA – He's back! He's going for gold! He's sober! Free National Anthem on the flipside Spectrum 48K £6
THE PIMAN'S GREATEST HITS – amazing stereo L.P. cassette £3
"I'M A PIMANIAC" – T Shirts (state size) £5
JOIN THE PIMANIACS CLUB for 20% off all products, pi-monthly magazine etc. Annual Subscription £5 U.K. £7 overseas
I ENCLOSE THE RIGHT MONEY OR DEBIT MY ACCESS/VISA CARD
CARD NUMBER
MY SIGNATURE
MY NAME
MY ADDRESS
POST CODE
NO EXTRAS! ALL OUR PRICES INCLUDE DELIVERY AND V.A.T.
Send to AUTOMATA U.K. LTD 27 Highland Road Portsmouth, Hants. PO4 9DA
24-HOUR CREDIT CARD HOTLINE (0705) 735242
MESSAGE FROM EVENS: PRIOR TO THE LAUNCH OF THE LESS-THAN-SENSIBLE PILAND BUGLE (EXCLUSIVE TO CERTIFIED SYNWIKID), I'VE BEEN SIFTING THROUGH AUTOMATA'S FAN MAIL. AS THERE WERE ONLY SIX LETTERS (TWO FROM CROUCHER, ONE FROM THE TAXMAN) IT WAS NO FAT TASK – BUT IT SEEMS IF I SAY HI THERE TO JAMIE DURANT OF PORRIDGE – SORRY, NORWICH, HE'LL WIN 5 QUID FROM HIS BROTHER – AND IF I MENTION MIKE "DEMENTED HEADBANGER" WILSON OF NUMB BUMBERSIDE, HE'LL BUY MORE AUTOMATA PRODUCTS, AND THEN PENFOLD AND CROUCHER CAN KEEP PAYING ME! ANYWAY – ON TO THE KARTUNE – IN WHICH UNCLE GROUCHO IS GOING TO GIVE A SLIDE SHOW
FOR YOU FASHION FIENDS, WE HAVE THIS ONE IN THE SHAPE OF A STILLETO-HEEL SHOE!
CUT THE CLOWNING! THIS IS GONNA BE A SQUEEZE AS IT IS!
WELL, SERIOUSLY, IT'S ABOUT TIME WE HAD A LOOK AT THESE
I CAN'T WAIT
AH – METROVILLE. "ALL THAT CONCRETE MADE ME ILL"...
PITY THE PICTURE'S CROOKED. WHAT'S PIMAN WAVING AT?
THE CAR THAT HAD JUST HIT ME AND IN THIS ONE HAS JUST HIT HIM!
HERE'S ONE OF ME BEING CHASED BY MS FLEMING WITH A BASEBALL BAT
WE JUST THOUGHT SOME PEOPLE DON'T KNOW YOUR COMPETITION IS STILL RUNNING
THAT'S JUST WHY THESE TRANNIES ARE COMING OUT!
IF THEY WIN THE GAME BASED ON OUR TRIP, THERE'S CHANCE TO GO TO HOLLYWOOD!
OH HERE'S WHERE WE TRIED ON THE CHIEFS HEADDRESSES AT INJUN CREEK, JUST PRIOR TO OUR EJECTION
I CAN'T HELP IT IF I'M TICKLISH!
THIS IS THE ONLY ONE WE TOOK IN BURGER VALLEY: HAL O'PAL, THE MOST INTERESTING GUY IN THE TOWN!
AH – TINSELTOWN! THAT WAS A PLACE!
THIS ISN'T TINSELTOWN – IT'S WRINKLE CITY!
OH YEAH! I THOUGHT THAT THAT WAS E.T.
OH, I REMEMBER THIS – BEING THRASHED MERCILESSLY BY A GANG OF ANGRY WRINKLE-CITY FOLK WHEN I TOLD THEM WE WANTED TO SPREAD JOY AND HAPPINESS!
MAYBE THEY THOUGHT YOU WERE SELLING SOMETHING!
NOW THIS IS TINSELTOWN. AND HERE WE ARE WITH SOME OF THOSE GREAT STARS WHO'LL NEVER DIE!
LONDON TO NEW YORK BY CONCORD. NEW YORK TO CALIFORNIA BY JET. MEET THE MYSTERY STAR OF THE PROGRAM. STOP AT THE FABULOUS WALDORF ASTORIA HOTEL IN N.Y. BEFORE TAKING A LEISURELY CRUISE HOME ON THE Q.E.2. AND £500 TO SPEND ON THE TRIP, WHICH'S FOR TWO PEOPLE. YOU COULD WIN THIS. CLOSING DATE IS JUNE 1st 1984, SO THERE'S STILL TIME JUST. AND EVEN IF YOU DON'T WIN – IT'S A GREAT GAME